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SUMMARY OF RECENT ABSTRACTS*

II. YELLOW FEVER

Distribution : Transmission

For many years LIÉGEOIS *et al.* (p. 136) have carried out protection tests in infants and adults in the Belgian Congo. At high altitudes the results were negative ; in the equatorial forest region the rate of positive results was low ; the highest rates were in the lower Congo and in parts of Ubangi and Uele, but there was no evidence of a recent epidemic in any region. A few sera from chimpanzees and monkeys were positive.

GARNHAM (p. 542) carried out investigations on forest mosquitoes in Kenya, in relation to yellow fever. The commonest species caught at 30 feet from the ground was *Aëdes deboeri*, which is not known to be a vector, but may be one.

HADDOW (p. 172) has investigated mosquito breeding in the axils of certain plants in Uganda—bananas, plantains, colocasias and pineapples were the plants mainly concerned. *Aëdes simpsoni*, a known vector of yellow fever, was found breeding in these plants, together with other mosquitoes. In a station in Uganda HADDOW and DICK (p. 458) found that of mosquitoes which bit anaesthetized monkeys at various levels from the ground, *Aëdes africanus* was the most common. *Aëdes africanus* has been implicated by HADDOW *et al.* (p. 457) in the forest cycle of yellow fever in Uganda ; the virus was isolated from a batch of these mosquitoes caught in nature in Bwamba. Monkeys were exposed on platforms at canopy level in the forest at various places ; only one of 39 became infected with yellow fever, in forest near Lake Victoria. SMITHBURN *et al.* (p. 823) have followed up this work, and report that monkeys exposed on platforms in the forest canopy became infected in 4 of 9 stations in one area. *Aëdes africanus* caught in nature were found to be infected, and passed on the infection to monkeys by bite. A new finding made by these workers was that a monkey injected with 133 *Phlebotomus* of various species developed yellow fever 34 days later.

MAHAFFY (p. 932) sums up the cycle of yellow fever in Bwamba County, Uganda, where he and his colleagues have studied it for several years. It is primarily a disease of primates in the forest, spread by *Aëdes africanus*, but the arboreal monkeys raid the plantations of the neighbouring Africans, for food, and in doing so they come into contact with *Aëdes simpsoni*, which may become

*The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1949, v. 46. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

infected from them and may spread the disease to man. This mosquito may also enter the forest for a blood meal. *Aëdes aegypti*, though present, apparently plays no part in the cycle.

BISHOPP (p. 1139) reports the first outbreak (1948) of yellow fever in Panama since 1905. In control, prompt and widespread immunization was practised.

KUMM (p. 1027) sums up the work done on jungle yellow fever in Brazil, in which *Haemagogus* species and *Aëdes leucocelaenus* were incriminated. KOMP (p. 1139) has found larvae of *Haemagogus argyromeris* in water in the leaf-bases of terrestrial and arboreal Bromeliads in the Panama Canal Zone, and also larvae of some unidentified Sabethines. He points out that these findings may have a bearing on yellow fever, since other species of *Haemagogus*, and some Sabethines, are known vectors.

PERLOWAGORA and HUGHES (p. 137) show that complement-fixing antibodies for yellow fever virus appear in infected marmosets 15–30 days after infection, reach their maximum titre at 4–5 weeks, then gradually disappear, almost all animals being negative at 9 months. This test, therefore, together with the protection test, can serve to determine the approximate time of infection with yellow fever virus in Nature.

Vaccination: Control

In Uganda DICK and SMITHBURN (p. 542) found positive protection tests in 82·8–91·8 of four groups of people inoculated with virus 17D 6 years before. There was no evidence of natural yellow fever infection during that period in that area, and these results corroborate earlier findings on the duration of immunity. In comment, MACCALLUM points out that persons with negative protection tests may have some residual immunity below the level that can be detected by those tests.

STEFANOPOULO and DUVOLON (p. 629) have not seen any harmful reactions to virus 17D vaccine in the course of 20,000 inoculations of people of all ages. On the other hand, the neurotropic mouse brain vaccine has produced some severe reactions affecting the nervous system.

In a long paper PAOLIELLO (p. 355) discusses the control of yellow fever and other mosquito-borne diseases. *Charles Wilcocks*

MALARIA

TOUMANOFF, C. & RAGEAU, J. Rapport sur l'enquête malariologique effectuée en Corse (15 octobre-15 novembre 1947). [**Report on a Malaria Survey of Corsica carried out from 15th October to 15th November, 1947.**] *Rec. Travaux Inst. Nat. Hyg.* Paris. 1949, Tome 3, v. 3, 1029–94. [Refs. in footnotes.]

A previous note gave the results of a cursory survey of malaria in Corsica carried out in August 1947 (see JAUJOU & TOUMANOFF, this *Bulletin*, 1949, v. 46, 315). The present report describes a more thorough survey carried out in the late autumn when malaria prevalence is on the wane. Forty-eight places were surveyed on the east and west coasts and in both plains and mountains. In nearly all places school-children were examined for spleen enlargement and for parasites, and a search was made for anophelines. The inquiry was to be the prelude to a more intensive antimalaria campaign in Corsica in which the DDT spraying of houses would be used.

The results of the inquiry in each place visited are detailed. These do not lend themselves to summary. The overall endemic indices were higher than those reported by investigators prior to 1930. The average spleen index was 36·3 per cent. and the parasite index 23·4 per cent. Fairly high rates were recorded on both west and east sides of the island ; the latter has long had an unenviable reputation for malaria. There are some very malarious areas in the south also. In the mountainous interior some places were very malarious, others free from the disease. Gametocyte carriers were extremely rare : they had been numerous in August. *P. falciparum* was more prevalent than *P. vivax* at this season, but there were places in which *P. vivax* was predominant. *P. malariae* was not seen.

Among anopheline larvae captured *A. claviger* was most prevalent in this late autumn season. Larvae of *A. maculipennis* and *A. hyrcanus* were found more rarely. *A. maculipennis labranchiae* may breed in "peridomestic" collections of water, garden cisterns and the like. Adult mosquitoes captured in houses included *A. maculipennis labranchiae*, *A. sacharovi* (?), *A. claviger* and *A. hyrcanus*. Females of *A. maculipennis* and *A. claviger* were found engorged with blood in some dwellings in the eastern plain. Two infected *A. maculipennis* were found. Female *A. maculipennis* captured in October were kept alive in the laboratory for several months. Although they were fed repeatedly they laid no eggs. The earliest egg-laying of this race of *A. maculipennis*, in experimental conditions, was in early February. *Norman White*

RAFFAELE, G. & COLUZZI, A. Relazione sulla malaria nella provincia di Frosinone negli anni 1945–48. L'epidemia malarica di Cassino. [**Malaria in the Frosinone Province in 1945–48. The Malaria Epidemic in Cassino.**] *Riv. di Malariologia*. 1949, Apr., v. 28, No. 2, 61–106, 6 figs. & 12 graphs. English summary (4 lines).

Before the war malaria endemicity in Frosinone Province was of low grade ; in 1943 only 16 cases were recorded. The only area in which malaria was more or less serious was in the Lower Liri Valley where severe outbreaks had occurred from time to time. In Ceprano, which is in that valley there were some 2,000 cases of malaria in each of the years 1934 and 1935 among a population of 7,500. Thereafter the incidence fell to a very low level till the epidemic wave of 1944. In 1945 malaria was widespread and severe throughout the province. Between April and October in Ceprano, two-thirds of which had been destroyed, 7,107 persons were treated for malaria. In Cassino, almost totally destroyed by bombardment, and containing not more than 1,500 inhabitants, and its immediate vicinity, 2,332 blood smears were examined between July and December, *P. vivax* was found in 770, *P. falciparum* in 585, and both species in 10. Anophelines were excessively prevalent. *A.m. labranchiae* was chiefly responsible for the epidemic. The living conditions of the population were most miserable.

This long and interesting report gives a graphic description of the subsequent development of the epidemic throughout the province and of the measures taken year by year to cope with a very difficult situation. For a time there was a lack of material and transport and trained staff. It was only in 1947 that sufficient DDT was available to permit of house spraying throughout the infected areas of the province. A marked fall in malaria prevalence followed. In the western part of the province only 634 cases of malaria were reported in 1947 among a population of about 118,000. In the central part of the province only 588 cases were reported compared with 8,760 in 1946. In the eastern part there were 1,438 cases compared with 12,946 in 1946. Only 15 cases of

P. falciparum infection were found during the year. The DDT treatment was continued in 1948: malaria has almost ceased to exist. *Norman White*

ROTTER, H. **Studies on Malaria in Italy during World War II (with special consideration of the Region of Frosinone).** *Acta Tropica.* Basle. 1949, v. 6, No. 2, 150–52.

See above.

See also p. 124, TREPODI, **Sui rapporti tra leishmaniosi viscerale e malaria.**

LINDBERG, K. Le paludisme en Afghanistan. [**Malaria in Afghanistan.**] *Riv. di Malariologia.* 1949, Feb., v. 28, No. 1, 1–54, 3 maps, 6 figs. & 1 chart. [53 refs.]

After a summary of the very scant information available in the literature concerning the prevalence of malaria in Afghanistan, the author records his observations made during a month's tour in that country in May–June, 1947. In several places he was able to search for anopheline larvae and examine the spleens of school children.

A concise account of the geographical features of the country is followed by a description of the very diverse climatic conditions prevailing therein.

In Herat, a town with a population of 85,000, situated in the north-west of Afghanistan at an altitude of 992 metres, larvae of *A. superpictus* were found, an interesting observation. Of 602 school children examined, 11·8 per cent. had splenic enlargement. The local doctors stated that malaria was a disease of only secondary importance. In the Province of Herat, and in the Province of Farah, which adjoins it to the south, cases of malaria in 1946 approximated 25 per cent. of all cases treated.

In Kandahar (60,000 inhabitants, 1,044 metres) no anophelines were found breeding; culicines were common. Malaria was said to be a common disease but the season does not start before June. In the Province of Kandahar, 26·9 per cent. of all patients treated in 1946 were suffering from malaria. In the adjoining fertile Province of Ghazni this percentage was 41·4, but here also the author failed to find any adult or larval anopheline.

In Kabul, the capital, (120,000 inhabitants, 1,799 metres), malaria is endemic but in normal times it is not a disease of great importance. Epidemic malaria, however, occurs from time to time. Such an epidemic in 1939 was described by L. FISCHER. This epidemic, starting in June, reached its height in September–October, when 2,829 cases were reported in a calendar month. There was a rapid fall in incidence in October. *P. vivax* was said to have been responsible for 75 per cent. of the infections. The author was unable to find any anophelines at the time of his visit. The spleen index of 958 children was 13·4 per cent.

Pol-Khomri (6,000 inhabitants, 650 metres), a small industrial town north of Kabul, is reputed to be very malarious, but here again the author's visit was too early in the year to obtain any direct information regarding the vector. The spleen rate of 90 children examined was 65·5 per cent.

Visits to numerous other localities are recorded.

Malaria is endemic in Afghanistan but the endemicity is for the most part very moderate, but there are hyperendemic areas. The period of transmission is short, not exceeding 4 or 5 months. The author considers it probable that *A. sacharovi* and *A. bifurcatus* [*claviger*] may act as vectors in parts of Afghanistan, but there is no direct evidence to support the supposition. As stated, *A. superpictus* was the only anopheline identified during his tour. Along the frontiers with India, Baluchistan, and Iran, the vector species of

those countries may well be concerned with malaria transmission: these include *A. culicifacies*, *A. multicolor*, *A. pulcherrimus*, *A. sergenti*, *A. turkhudi* and *A. stephensi*. *Norman White*

DOWNS, W. G. **Malaria on Okinawa.** *Bull. U.S. Army Med. Dept.* 1949, Aug., v. 9, No. 8, 652–5, 1 fig.

When landings were made in Okinawa in April 1945 it was feared that malaria might be a problem of serious importance, but it soon became apparent that malaria was a very minor problem under normal conditions of life on the island. During April, May and June the blood of 2,209 natives of the island was examined: malaria parasites were found in only nine. Several Okinawan doctors denied that there was malaria in the island, while others in Northern Okinawa said they saw a few cases every summer.

Anopheles hyrcanus var. *sinensis* was found breeding in rice fields, often in great numbers. *A. saperoi* (Bohart and Ingram) was a rare species. *A. hyrcanus sinensis* was rarely found in dwellings or in the numerous caves that had been constructed by the people. Culicines were commonly found in houses and caves; *C. quinquefasciatus* [*C. fatigans*] was frequently found infected with *Wuchereria bancrofti*.

At the time of the invasion livestock were present in considerable numbers: a month and a half later they were very rare. Anophelines were deviated to man for food. Airplane spray controlled *A. hyrcanus sinensis* breeding in the flat southern half of the island, which was the battle zone. This method of control was less effective in the mountainous northern half, and here refugees from the battle zone were concentrated by thousands in camps. An extensive outbreak of malaria occurred in these camps in mid-July. All the patients seen had *P. vivax* malaria. About 10 per cent. of the Okinawans were infected. By mid-September the epidemic had waned. All the dwellings had been treated with DDT.

"It is important to remember, when assessing the malaria hazards of a region in connection with military operations, that the military operations themselves may greatly alter the normal biological balances, creating much more favorable conditions for malaria transmission than normally exist."

Norman White

MUDROW-REICHENOW, Lilly & KIKUTH, W. Neue Forschungsergebnisse ueber die Biologie der Malariaparasiten. **[New Researches on the Biology of Malaria Parasites.]** *Deut. med. Woch.* 1949, June 17, v. 74, No. 24, 759–63. [15 refs.]

The authors give a historical account of the development of our knowledge of the exoerythrocytic phase of the life-cycle in *Plasmodium*, including the recent discoveries concerning the human malaria parasites. *C. A. Hoare*

KINKEL, H. Ueber Parasitierung von Reticulocyten durch Malariaplasmodien. **[Invasion of Reticulocytes by Malaria Parasites.]** *Ärztl. Forschung.* 1949, Mar. 25, v. 3, No. 6, 142–5.

In view of discrepancies in the published estimates of the proportion of reticulocytes harbouring malaria parasites, which the author attributes to differences in the technique employed and to the stages of parasites observed, he has re-investigated this problem, using *Plasmodium vivax*, in 18 cases of natural and 12 cases of induced malaria, by the following method. A 1 per

cent. isotonic solution of brilliant-cresyl-blue—used as a vital stain for reticulocytes—was mixed with an equal part of blood in a glass container. The mixture was shaken repeatedly and then allowed to stand for half an hour, after which films were made and stained by the May-Grünwald-Giemsa method. In the films the proportion of mature and immature red blood corpuscles was determined, and counts were made of parasites in various stages of development found in host-cells of different degrees of maturity.

In the great majority of cases the proportion of reticulocytes in the blood was found to be high, and from 60 to 100 per cent. of the cells harbouring young parasites were reticulocytes, as determined by vital staining of the granular inclusions. In the minority of cases, with a low proportion of reticulocytes in the blood, the degree of their invasion by parasites was also low. However, calculations showed that the relative number of infected cells containing vitally stained granules was actually higher in these cases than in those with numerous reticulocytes in the blood. It is also noted that multiple infection occurred more commonly in reticulocytes than in erythrocytes.

The vitally stained granules in infected reticulocytes undergo certain structural and tinctorial changes, but there is no evidence that they are in any way related to Schüffner's dots. *C. A. Hoare*

RIBBANDS, C. R. **Studies on the Attractiveness of Human Populations to Anophelines.** *Bull. Entom. Res.* 1949, Aug., v. 40, Pt. 2, 227–38, 4 figs. [12 refs.]

Three groups of experiments made during 1941 and 1942 are recorded in this paper. The first was at Aberdeen, Sierra Leone, to investigate the fluctuations in the attractiveness of human beings to *Anopheles melas*. Three Africans slept for 49 nights in separate huts, each man in a different hut each night; towards the end of the period a fourth man was introduced for 19 nights. Mosquitoes attracted to the men were killed nightly with a pyrethrum spray, collected and recorded. The total catches of female *A. melas* from the three men were 1,068, 902 and 918 respectively. The records showed that there were increases and decreases in individual attractiveness and that the fourth man attracted most mosquitoes during his first few nights.

The second series was undertaken to compare the relative attractiveness to mosquitoes of several men and one man. The mosquitoes were (in Aberdeen) *A. melas* and (in a village near Sekondi, Gold Coast) *A. funestus* and *A. gambiae*. The experiments differed in detail but they all showed that a number of men in a hut were more attractive to hungry unfed female mosquitoes than is one man alone. The ratios of the number attracted to the three men to the number attracted to one man was as follows :—for *A. melas*, 2·72 : 1 ; for *A. gambiae*, 2·38 : 1 ; and for *A. funestus*, 2·28 : 1.

The relation between anopheline infestation and population distribution was also investigated at the village near Sekondi. This village was about 500 yards from a military hospital and a survey revealed that the village huts were infested with *A. gambiae* and *A. funestus* which bred in a swamp a little further off. It was decided to pull down the village, but before doing so, an experiment was designed to compare mosquito catches in the huts with those in the surrounding district, before and after removal of the village. Daily catches were made for a week and then all the huts were pulled down, except two experimental ones and another for the observer. The catches in the experimental huts increased immediately, as also did those in a control hut erected between the village and the swamp ; but they soon settled down in the experimental hut to between 25 and 50 per cent. greater than before and in the inner control hut to between 100 and 150 per cent. greater. Catches in the outer

control huts, which were situated within the hospital precincts, were considered to be the best available measure of the local mosquito population, and all catches were expressed as percentages of those made in these huts.

The author has drawn the following conclusions from his results and observations :—individuals differ in their attractiveness to unfed female anophelines ; the attractiveness of one individual varies from time to time ; some anophelines arrive at a hut to rest and then, becoming hungry, seek food, and not finding it, depart ; other anophelines arrive at a village attracted by the scent of the people and are not there by chance ; the number of anophelines thus attracted is proportional to the size of the community but the total number of anophelines is related to the capacity of the breeding place ; consequently, the number of anophelines per person tends to be in inverse ratio to the size of the community and malaria risks greater in smaller communities ; this seems to indicate that in certain circumstances there would appear to be "safety in numbers."

H. S. Leeson

RAGAB, H. A. **Observations on the Isolated Gut of the Mosquito.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1949, Sept., v. 43, No.2, 225–30, 1 fig. [14 refs.]

The author attempted to isolate the gut of mosquitoes (*Aëdes aegypti* and *Anopheles maculipennis atroparvus*) ; the former were sometimes infected with *Plasmodium gallinaceum* and showed oöcysts.

The dissected gut was first put under a coverslip sealed on to a slide and perfused with a nutrient medium through capillary tubing. Bacterial contamination became troublesome and so certain aseptic precautions were introduced. These were fairly successful, though when penicillin was added to the medium it shortened the life of the preparation. Eventually a special slide was constructed of perspex ; this is described and illustrated. A table lists the techniques which were tried, including the various media, and gives the results obtained with each.

The longevity of the gut was judged by its contractions, and it was shown that it could be kept alive for four days. The oöcysts were measured at the beginning and at the end of each experiment ; these measurements showed that the oöcysts did not grow. The author intends to continue his search for an entirely aseptic method of isolating the gut of the mosquito.

H. S. Leeson

COLLESS, D. H. **The Anopheline Mosquitoes of North-West Borneo.** *Proc. Linnean Soc. of New South Wales.* 1948, v. 73, Pts. 3/4, 71–119, 20 figs. [32 refs.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1949, Aug., v. 37, Pt. 8, 145–6.]

Keys, based on those of Russell, Rozeboom & Stone, are given to the females and fourth-instar larvae of species of *Anopheles* taken between June 1945 and January 1946 in a coastal strip of north-west Borneo, lying partly in Sarawak and partly in British North Borneo, and certain other species recorded from Borneo or possibly occurring there. The local distribution of each of the 21 forms found and examined by the author is given, together with descriptions of various stages (adults of both sexes and larvae) from examination of the local material and notes on bionomics for all except one, of which only one larva was taken. A list is included of types of breeding places in which the various species are usually found.

A. leucosphyrus, Dön., was represented by two subspecies, one named *pujutensis*, n., and the other considered to be *A. l. balabacensis*, Baisas. The

larva and adults of both sexes of both are described and the distribution of members of the *leucosphyrus* complex in Borneo and elsewhere is discussed. *A. leucosphyrus* was found to be an important vector of malaria in Borneo by McArthur, but it is doubtful to which subspecies his record refers. Of seven forms of which the blood preference was studied, *A. l. balabacensis* showed the greatest tendency to feed on human blood, followed by *A. hyrcanus nigerrimus*, Giles, *A. separatus*, Leic., *A. tessellatus*, Theo., *A. barbirostris*, Wulp., *A. philippinensis*, Ludl., and *A. kochi*, Dön. Females of all species of which any were available were dissected for malaria parasites. The only infection found was one gut infection in *A. barbirostris*, and the potentialities of this species as a vector should not be overlooked, although it is mainly zoophilous. *A. sundaicus*, Rdnw., and *A. umbrosus*, Theo., are also considered of potential importance. Females of the former entered houses in search of blood and females of the latter were frequently taken biting under jungle cover. The author regards *A. novumbrosus*, Strickland, as a synonym of *A. umbrosus*; it was distinguished from the latter mainly by characters of the larvae, but he considers that the original description of the larva of *umbrosus* applied not to that species but to *A. letifer*, Sandosham.

GOLDEN, A. & OVERMAN, R. R. **I. Experimental Cortical Necrosis of Adrenal Gland in the Monkey in Diphtheria and in Malaria. With Observations on a Fatal Human Infection with** *Plasmodium falciparum*. *Amer. J. Clin. Path.* 1949, Oct., v. 19, No. 10, 899–906, 10 figs.

" 1. Focal adrenal cortical necrosis, such as is seen in epidemic typhus, can be produced experimentally in guinea pigs and monkeys by inoculation of virulent diphtheria organisms, and in monkeys by malarial infection with *Plasmodium knowlesi*.

" 2. Identical but more severe lesions were found in the adrenal glands of a woman with an overwhelming infection with *Plasmodium falciparum*.

" 3. The adrenal lesions in monkeys dying of experimental malaria can be prevented by administration of lipoidal adrenal cortical extract."

THIODET & FOURRIER. La pathogénie de l'accès palustre. Rapports avec le choc anaphylactique. Corollaires thérapeutiques. [**Pathogenesis of the Malaria Attack ; its Relation to Anaphylactic Shock ; Therapeutic Implications.**] *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1949, Nos. 21/22, 798–806. [10 refs.]

The authors describe at some length the close analogies that exist between the symptoms of an attack of malaria and those of anaphylactic shock. The changes that can be noted in the blood and vascular system during an attack of malaria are identical with those that characterise the " *choc hémoclasique* " of Widal—leucopenia, relative increase in mononuclear cells, lowered coagulation rate, lowered arterial tension, lowered surface tension of serum, with increase of refractometric index. The same changes in the protein content of the serum are observed in both conditions.

If the malaria attack and anaphylactic shock are homologous one should be able to suppress the attack by desensitizing the patient. This the authors have tried to do by the intradermal injection of autoglobulins. These globulins are prepared by bubbling CO_2 through some of the patient's serum diluted with distilled water : the globulins thus precipitated are then suspended in normal salt solution. Ten patients were treated in this way. They all had typical attacks of malaria (6 *P. vivax*, 4 *P. falciparum*) but none of them was gravely ill.

The results of the treatment were uniformly favourable. Fever was suppresse more or less rapidly—in less than 8 days in all cases. The treatment had, course, no effect on the malaria parasites; these were often more numero after the cessation of fever than they were at the start. All the same th method might be of value in the treatment of pernicious malaria.

Norman White

MASSIAS, C. Le paludisme pernicieux. Etude biochimique, lésionnelle, path génique et thérapeutique. [**Biochemical, Pathological, Pathogenic an Therapeutic Study of Pernicious Malaria.**] *Bull. et Mém. Soc. Méd. Hôpi de Paris.* 1948, Nos. 32/33, 1118–23.

This is a contribution based on the study of 88 cases of pernicious malaria i Hanoi. Forty of these were fatal. A post-mortem examination was made i 18; the post-mortem findings are summarized. Comprehensive biochemic observations were made in all 88 cases. The urine was scanty: albumi urobilin, hyaline and granular casts, and leucocytes, were always present, bu there was neither haemoglobinuria nor glycosuria. In the blood bilirubi was always increased, up to 300 mgm. per 1,000 gm. or more: glucose ver variable: urea much increased in grave cases: polypeptides much increase

The author concludes that pernicious attacks of malaria are not due t thrombosis of cerebral vessels; they are toxic in origin. It is not possible t determine whether the toxin is parasitic in origin, or endogenous resulting fro lysis of erythrocytes or from damage to the reticulo-endothelial system. Th dominant features are the profound involvement of the reticulo-endotheli system of spleen and liver; damage to endothelium of blood vessels muc dilated by central or peripheral vasomotor disturbance; and damage to splee liver and kidney producing acute hepato-nephritis.

Prognostic factors are the intensity of the parasitaemia, more especially i the viscera, the degree of involvement of liver and kidney, and the intensit and location of the vasomotor disturbance which determines the special form the attack—cerebral, cardio-vascular, hepatic, renal, or suprarenal.

Prompt treatment is essential. The author uses intravenous or intramuscula injections of 0·3 gm. quinacrine [mepacrine] a day (for 3 to 5 days at most) as lon as the pernicious symptoms persist. The acute hepato-nephritis require appropriate treatment; saline injections are contraindicated as there is retention of chlorides. Parenteral injections of dextrose should be given, wit insulin subcutaneously. Parenteral injection of ascorbic acid with a larg dose of thiamin may be of value. Circulatory collapse requires very promp treatment.

Norman White

HORMANN, Hartwig. **Serologische Reaktionen und Immunität bei Malaria.**

This book is reviewed on p. 174.

THIODET, J., BOULARD, G., FOURRIER, A. & RAFFI, A. Accès pernicieu palustre à "*Plasmodium malariae.*" [**Pernicious Attack of** *P. malaria* **Malaria.**] *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1949, Nos. 19/20 745–7.

A native Algerian, 16 years of age, was admitted to hospital with the sign and symptoms of nephritis with much oedema. Four days later the sudde onset of pulmonary oedema was followed after a few hours by a rise in tempera ture to 104°F. The blood was found to contain very numerous *P. malariae* i all stages of development. In spite of very energetic treatment with quinin

the patient died. The authors consider that the malaria infection was the chief cause of death—that it was, in fact, a case of pernicious quartan malaria.

Norman White

MELEAGROS, J. **Cerebellar Syndrome and Chorea due to Malaria.** *Cyprus Med. J.* 1949, Mar., v. 2, No. 5. [In Greek 99–104. English summary 104–5. 12 refs.]

An account of one case of each.

QUIROGA, J. Nuevos ensayos sobre tratamiento de la terciana benigna, por la quinina-resorcina. [**Treatment of** *P. vivax* **Malaria with Quinine-Resorcin.**] *Archivos Sec. Salud Publica de la Nación.* Buenos Aires. 1948, Jan., v. 3, No. 14, 59–63. [10 refs.]

The author reports the treatment of 31 patients suffering from *P. vivax* malaria with quinine-resorcin. The drug was given in the form of tablets, each containing 0·08 gm. quinine hydrochloride, 0·02 gm. resorcin. Three tablets a day was the adult dose. The therapeutic efficiency of the 30 cgm. of quinine-resorcin contained in 3 tablets is said to be equivalent to that of 1·20 gm. of quinine hydrochloride [though it does not contain that amount] in this form of malaria, at a third of the cost.

Of the 31 cases (*P. vivax* malaria) treated a clinical cure resulted in 26. In five of these patients, however, parasites could still be found in the blood at the end of treatment.

Norman White

DASGUPTA, B. K. **Quinine Amblyopia.** *J. Indian Med. Ass.* 1949, Sept., v. 18, No. 12, 456–9, 6 figs. [11 refs.]

A report of two cases.

MENK, W. & MOHR, W. Malaria-tertiana-Behandlung mit der 5tägigen kombinierten Atebrin-Plasmochin-Kur nach Hauer. [**Hauer's Method of Treatment of Tertian Malaria by a Five-day Course of Atebrin and Plasmoquine.**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1949, Aug., v. 1, No. 2, 201–5.

In 1943 Hauer advocated the treatment of tertian malaria by giving for 3 days 2 tablets of atebrin [mepacrine] (0·1 gm.) and 1 tablet of plasmoquine (0·01 gm.), each 3 times a day ; on the 4th day 2 tablets of atebrin 3 times and on the 5th one tablet 3 times. This was tried by the authors, with SCHUPPE and ROHRER, in the next two years and of 68 patients with their first attacks, 32 with their first relapses and 48 with later relapses—148 in all—the majority were free of fever on the first day of treatment and nearly all by the second day ; only 4 had fever after the 3rd day. Schizonts were not seen in the blood of the first-attack patients after 3 days, except in the four who had fever for another day ; gametocytes were not seen after 3–4 days. Patients, however, complained of side-effects, abdominal pain, headache, nausea, vomiting and diarrhoea.

Estimation of the relapse quota was very difficult, because after leaving the clinic the patients scattered and attempts to follow them up rarely succeeded, but the general impression was that relapses were no less under this scheme than under the older methods of treatment ; it was some 40 per cent. and the enlargement of liver and spleen persisted.

Consequently, for 4 weeks after completing the Hauer course, the authors gave on two successive days each week 0·1 gm. atebrin 3 times a day. To other patients, between 23 and 26 days after the Hauer course they gave a so-called

" safety course " of atebrin, 0·1 gm. thrice daily for 5 days, but these measures produced no obvious influence on the relapses. Fourteen relapses were observed between the 20th and 26th days after the end of the course, that is, parasites were again seen in the blood, but clinical relapse soon followed. Twelve more relapsed between the 27th and 40th and the same number between the 40th and 60th days, 18 between the 60th and 80th and 8 more between the 80th and 100th days, and 6 later still.

In a second series, 0·3 gm. of atebrin musonate was injected intramuscularly twice daily for the first 3 days, in place of Hauer's oral method ; in other respects the original Hauer scheme was followed : 196 patients were thus treated. The first-attack patients were free from fever in, on an average, 1·7 days ; first relapse patients in 1·6, and later relapses in one day. With this form of treatment side-effects were less common ; 17 complained of abdominal pain but no other complaint of any moment was made. Relapses, as in the former series, were not easy to determine ; 16 occurred between the 18th and 22nd days and 3 later, and 71 between 4 and 8 weeks.

In a third series of 16 cases, plasmoquine was given by injection and only on the last two days atebrin *per os* ; nothing of importance was gathered from these ; the numbers were too small and the follow-up too difficult.

The authors conclude that the short Hauer course has no advantages over earlier methods of treatment ; the side-effects from oral administration were not seen with the injection method and the relapse-quota was certainly not smaller, and was perhaps even greater, with the Hauer method than with older methods. When atebrin was injected, the results were more comparable with the old atebrin-plasmoquine treatment. *H. Harold Scott*

SZYMOŃSKI, K. Doświadczenia kliniczne nad dzialaniem leczniczym paludryny w zimnicy. [**Clinical Observations on the Effect of Paludrine in Tertian Malaria.**] *Przeglad Epidemiologiczny*. Warsaw. 1948, v. 2, Nos. 3/4, 305–19, 1 chart & 1 folding fig. [14 refs.]

The English summary appended to the paper is as follows :—

" In order to investigate the therapeutic action of paludrine in malaria, 4- cases of benign tertian malaria have been treated with this drug. Only patients with positive blood film have been considered. The white blood cell count, tests for albuminuria, urobilinogenuria and the Takata-Ara test in blood serum have been employed in every case as tests for bone marrow, kidney or liver damage.

" A possibly close follow-up of cases has been arranged. The dose employed was thrice daily 0·1 gm. for 7 or 10 days. No recurrence of raised temperature during this treatment was observed after 84 and half hours in average, but all other signs subsided even earlier. The number of relapses, as observed in the follow up, certainly did not exceed 4·5 per cent. Any [?no] indication of ill side effects could be observed, neither any complaints of the patients recorded.

" Paludrine seems to be, so far, the best anti-malarial drug among those introduced on wider scale nowadays, as it corresponds better to the requirements for such a drug (stated by Sinton), than any other drug in the past."

BLANC, F. Essais de traitement et de prophylaxie du paludisme par la paludrine en Indochine (juillet–novembre 1947). [**Treatment and Prevention of Malaria in Indo-China with Paludrine.**] *Méd. Trop.* Marseilles. 1949, Mar.–Apr., v. 9, No. 2, 143–72, 25 charts.

A hundred patients suffering from malaria were treated with paludrine [proguanil] in the hospitals of Saigon during a period of three months. Clinical

notes of 25 of these cases are given in detail. Each patient was given three 0·10 gm. tablets of paludrine a day for 10 days. The drug was found to be remarkably effective in a great variety of clinical forms of the disease. Temperatures fell to normal on the 3rd day and all asexual forms of the parasite had disappeared from the blood by the 4th or 5th day. The action of paludrine on splenomegaly was remarkable: the spleen had generally ceased to be palpable in 15 days. Red cell counts and the haemoglobin index nearly always regained normal levels within two weeks. This rapid action appeared to be due to the fact that the drug acts not only on the parasites in the circulating blood but also on exoerythrocytic forms which neither quinine nor other synthetic drugs are able to do. *P. falciparum* infections appear to have been radically cured: some of the patients were sent to a hill station where conditions are favourable for relapses but none of them relapsed during a period of 3 months. Two-thirds of the *P. vivax* infected patients relapsed, however, between the 27th and 40th days from the end of treatment. Those, however, who took two tablets a week as a suppressive after the end of treatment had no further clinical manifestations of the disease.

Paludrine was readily absorbed even by patients with very defective digestion, notably patients with concurrent amoebic infection. There was not the least sign of intolerance to the drug. The author expresses the opinion that paludrine is the most valuable drug for the treatment of malaria that has hitherto been discovered.

As a suppressive paludrine was issued to three groups of troops—a European unit of 774 men; a North African unit, 140 Europeans and 600 Moroccans; a mixed unit of races of Indo-China, 1,172 men. Two of these units were operating under war conditions. All were exposed to heavy infection. Each man received one tablet of paludrine twice a week. By the end of two months the incidence of malaria had fallen to zero. Quinacrine prophylaxis had never given nearly such good results. Eloquent testimony to the drug's value is afforded by the fact that the men demanded their tablets. *Norman White*

BERBERIAN, D. A. & DENNIS, E. W. **The Effect of Chloroquine Diphosphate on Malaria Splenomegaly.** *Amer. J. Trop. Med.* 1949, July, v. 29, No. 4, 463–71. [11 refs.]

In a previous paper the authors reported satisfactory results from the use of chloroquine diphosphate in the treatment and suppression of malaria in hyperendemic malarial villages in the Lebanon [this *Bulletin*, 1949, v. 46, 707]. The present paper is concerned with the reduction in splenomegaly that accompanied the weekly administration of 0·5 gm. of the drug. In the village of Saideh, where no anti-mosquito measures were undertaken, the spleen index was reduced, from 59 to 6 per cent., and the average size of enlarged spleen (Hackett's scale) from 1·9 to 0·12 within 26 weeks of such suppressive chloroquine administration. In the neighbouring village of Amik where malaria was effectively controlled by DDT residual spraying, but where no suppressive drugs were taken, the reduction in the spleen index during 8 months was only from 70 to 50 per cent. Chloroquine diphosphate 0·5 gm. a week can be continued for at least seven months without producing any undesirable side-effects, even in pregnancy. The combination of DDT spraying with mass chloroquine diphosphate suppression might secure malaria eradication in a single season in villages such as these. *Norman White*

TRAVIS, B. V., MORTON, F. A., JONES, H. A. & ROBINSON, J. H. **The more Effective Mosquito Repellents tested at the Orlando, Fla., Laboratory, 1942–47.** *J. Econom. Entom.* 1949, Aug., v. 42, No. 4, 686–94.

PATRISSI, T. L'impiego del DDT nella lotta antimalarica. [**The Use of DDT in the Antimalaria Campaign.**] *Ann. d. San Pubblica.* Rome. 1949, Jan.–Feb., v. 10, No. 1, 3–93, 4 figs. & 32 graphs. English summary.

This paper contains a vast amount of information about DDT, collected from many sources, but more particularly it describes the remarkable decline in malaria morbidity that has attended its use in various parts of Italy. Graphs illustrating the monthly incidence of malaria during 1946, 1947 and 1948 in numerous places are produced. The methods employed in house spraying are fully described. Malaria mortality which was high at the close of the war has been almost eliminated. Only three deaths were attributed to malaria in 1948.

Although house-spraying has afforded such remarkable protection against infection it has not, in many places, eliminated the vector species of *Anopheles*. Larvae of *A. superpictus* and *A. m. labranchiae* can still be found in a number of places in Sardinia, Sicily and South Italy where the houses have been thoroughly treated. In untreated premises used as mosquito catching stations in these treated areas a certain number of adults of these species can still be taken. In Latina, however, *A. m. labranchiae* and *A. clutus* [*A. sacharovi*] appear to have been eliminated. Provided that the vector species do not develop a resistance to DDT, its continued use may well reduce malaria incidence in Italy to insignificant proportions, but it would be unwise to discard the time-honoured land reclamation measures of control in places where conditions are especially favourable to anopheline production.

The use of DDT as a larvicide has yielded poor results. *Norman White*

POOL, C. L. DDT vs. paludismo en la División del Oriente de la Creole Petroleum Corporation, Venezuela. [**DDT against Malaria in the Eastern Division of the Creole Petroleum Corporation, Venezuela.**] *Bol. Med.* Caracas. 1949, Jan., v. 1, No. 2, 147–59, 2 figs. English summary.

This paper records the remarkable results obtained by the first year's spraying of dwellings with DDT, a method that was superimposed on older environmental measures of malaria control, in certain properties of the Creole Petroleum Corporation in Venezuela. In one district, Caripito, all the dwellings and outhouses, with very few exceptions, harbouring a population of 20,000, were sprayed every four months, beginning in April 1947. The camp in Caripito in which dwell about a quarter of the population has been "protected" by control measures for a number of years and a noteworthy decrease in the incidence of malaria resulted. [The methods employed in this DDT campaign have been described by GABALDON in "The Nation-wide Campaign against Malaria in Venezuela"—this *Bulletin*, 1950, v. 47, 4].

During the six years April 1940 to March 1947 the annual incidence of malaria in Caripito per 1,000 national employees of the Company averaged 331. This number includes only cases in which the diagnosis was established by blood examination. The incidence during the first year of the DDT campaign was 43 per 1,000. If the first two months of the campaign year be ignored, the annual rate for the remaining 10 months was only 28 per 1,000. These figures include relapses.

A. darlingi was the most important, probably the only, vector of malaria in Caripito: none of this species was caught in mosquito traps in July and August 1948.

The author considers that other factors may have contributed to the striking results achieved. On no account should the environmental measures that have been patiently developed through many years be prematurely abandoned.

Norman White

PINOTTI, M. Do combate ao impaludismo no Brasil pelo Serviço Nacional de Malaria. [**Antimalaria Campaign in Brazil of the National Malaria Service.**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1949, Jan., v. 1, No. 1, 45–52.

The author outlines the plans that have been made by the National Malaria Service for an almost nation-wide intensified campaign against malaria in Brazil. For medical treatment reliance is being placed on chloroquine. All sufferers will receive a single dose of 1·0 gm. of the salt of chloroquine : this is the adult dose. Arrangements for the distribution of the drug are described.

The spraying of houses with DDT will be extended to cover all areas in which *A. darlingi*, *A. albitarsis* or *A. tarsimaculatus* are vectors. In the case of the last-named, animal houses will also be treated.

In the southern coastal areas where *A. cruzii* and *A. bellator* are vectors, experiments are being carried out as to the most effective measures of control.

Norman White

See also p. 110, GOLDEN & OVERMAN, **I. Experimental Cortical Necrosis of Adrenal Gland in the Monkey in Diphtheria and in Malaria.**

OVERMAN, R. R., BASS, Anne C., DAVIS, A. K. & GOLDEN, A. **II. The Effect of Lipo-Adrenal Extract on Ionic Balance in Fatal Simian Malaria.** *Amer. J. Clin. Path.* 1949, Oct., v. 19, No. 10, 907–17, 4 figs. [20 refs.]

" The following differences were observed between two groups of monkeys identically infected with *Plasmodium knowlesi*, one of which received daily injections of 5 ml. of lipo-adrenal extract :

" 1. The extract-treated animals uniformly outlived their controls.

" 2. The control animals showed earlier development of high parasitemias which attained average values 100 per cent greater than the extract-treated animals.

" 3. Sodium entrance into erythrocytes and tissue cells and loss of potassium from cells was significantly reduced in the treated group.

" 4. Our results indicate that ionic distribution in the normal subject depends upon a functional balance between the so-called ' salt-and-water-balance ' type and the ' carbohydrate-active ' type of steroids of the adrenal cortex."

REICHENOW, E. Die Entwicklung der Malariaplasmodien im Vogelkörper. [**The Development of Malaria Parasites in Birds.**] *Zent. f. Bakt.* I. Abt. Orig. 1947, Oct. 24, v. 152, Nos. 3/4, 272–84, 2 figs.

After a brief survey of previous work on the early stages of development of various species of avian *Plasmodium*, the author describes the life-cycles of *P. praecox* [=*P. relictum*] and *P. cathemerium*, which he and his collaborators have studied in the canary. In both these species the development is essentially of the same type. The first generation arising from the sporozoites [pre-erythrocytic stages] develops in the endothelial cells or in phagocytes. The multinucleate schizonts produce merozoites with abundant cytoplasm (=macromerozoites) which continue the endothelial [exoerythrocytic] phase of development. Sometimes in the 2nd, but usually in the 3rd generation, some

of the schizonts produce twice or four times as many nuclei, finally segmenting into a corresponding number of merozoites with scanty cytoplasm (=micromerozoites), which are similar to those arising by schizogony within the erythrocytes. The micromerozoites of different endothelial generations attack red blood corpuscles and initiate the erythrocytic phase of development. About one-third of these merozoites are transformed directly into gametocytes, while the remainder become schizonts. The exoerythrocytic parasites continue their development in the endothelial cells and constitute the source for relapses after the erythrocytic parasites have disappeared from the blood.

C. A. Hoare

CORRADETTI, A. Studi sulla patologia e immunologia comparate nelle infezioni da emosporidi. [**Studies on the Comparative Pathology and Immunology of Haemosporidia Infections.**] *Riv. di Parassit.* Rome. 1949, Sept., v. 10, No. 3, 129–41. [50 refs.] English summary.

The histological location of the schizogonic cycle of the various *Plasmodia* varies with the species, and findings for any one species cannot be extended by analogy to others. An attempt is being made to discover whether such variations are related to variations in the pathological and immunological reactions of the vertebrate hosts at different stages of infection.

With *P. gallinaceum* the course of infection is determined by the nature of the infective material inoculated, either sporozoites, or emulsions of organs containing endo-histiocytic forms, or infected blood, and by the immunity response of the host. With *P. elongatum* such variations do not occur and there is no immunity response to infection.

In infections with those *Plasmodia* which undergo a cycle of development in the reticulo-endothelial system the host displays no phagocytic activity against the parasite, but only against pigment. Phagocytosis of parasites does occur, however, in infections with *Plasmodia* which have either haemoblastic or hepatic endo-epithelial cycles of development, or an endo-erythrocytic cycle alone.

Though "parasitolytic" immunity response is lacking in *P. elongatum* infections, very active parasite phagocytosis by macrophages in the internal organs occurs. "Parasitolytic" immunity response occurs in *P. vivax* infections, in which phagocytosis of parasites occurs, and in *P. gallinaceum*, *P. praecox* [*P. relictum*] and *P. cathemerium* infections in which phagocytosis of parasites is not observed.

Gametocyte development in red blood cells is the only characteristic common to all *Plasmodia* in their development in the vertebrate host.

The author considers the term "exo-erythrocytic" to be inadequate. He suggests its substitution by endo-haemoblastic, endo-histiocytic, and hepatic endo-epithelial.

Norman White

MICKS, D. W. **Malaria in the English Sparrow.** [Research Notes.] *J. Parasitology.* 1949, Oct., v. 35, No. 5, 543–4.

English sparrows from 25 States of the U.S.A. were examined during all months of the year for the presence of malaria. Most of the specimens came from Maryland. Each blood slide was examined for 20 minutes: 516 birds

were studied and parasites were found in 11 per cent. The predominant infection was *Plasmodium relictum* (31) ; 5 sparrows showed *P. cathemerium*, 4 *P. elongatum* and 18 an unidentifiable parasite. In January and February the birds were free from infection ; by March parasites started to appear, they became numerous in the summer months and decreased towards the end of the year. This comparatively high incidence of malaria in the non-migratory sparrow is stressed by the author. *P. C. C. Garnham*

CANTRELL, W. & JORDAN, Helen B. **Relative Susceptibility of** *Aëdes aegypti*, *Aëdes albopictus*, *Aëdes canadensis* **and** *Anopheles quadrimaculatus* **to** *Plasmodium gallinaceum*. *J. Infect. Dis.* 1949, Sept.–Oct., v. 85, No. 2, 170–72.

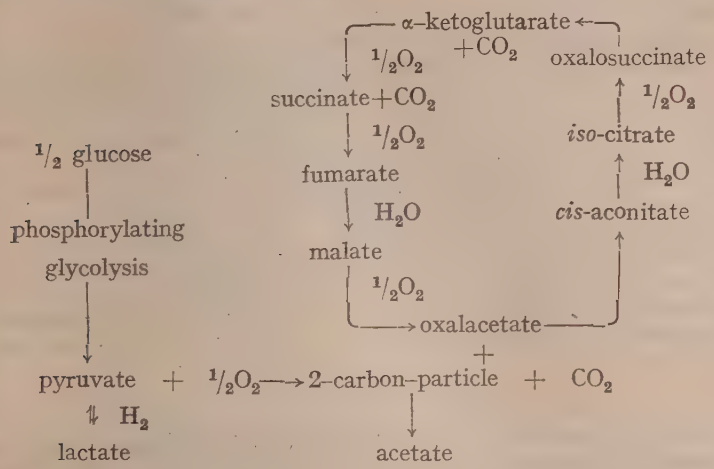
The growth of *Plasmodium gallinaceum* in various species of mosquitoes was studied. *Aëdes aegypti* was used as the " yardstick " and in each experiment mosquitoes of this species and of another were allowed to feed simultaneously on an infected chicken. After feeding, the mosquitoes were lightly anaesthetized with ether and any that had not fully engorged were discarded. The remainder were maintained at 29°C. for 5 or 6 days, when they were dissected, the oöcysts counted and sometimes measured. *Aëdes aegypti* was always highly susceptible to infection. *Aëdes albopictus* was equally so and showed about the same number of oöcysts, though these were smaller in size. *Aëdes canadensis* was only slightly susceptible ; 9 of 17 *Anopheles quadrimaculatus* became infected (as compared with 17 out of 18 *Aëdes aegypti*).

[In nearly all instances the experiments were confined to observations on oöcyst production. A more complete knowledge of susceptibility should embrace the situation in the salivary glands, *i.e.* whether or not the sporozoites reach these organs and in what density.] *P. C. C. Garnham*

MOULDER, J. W. **Inhibition of Pyruvate Oxidation in the Malarial Parasite** *Plasmodium gallinaceum* **by Quinine Treatment of the Host.** *J. Infect. Dis.* 1949, Sept.–Oct., v. 85, No. 2, 195–204. [20 refs.]

The author recently showed [this *Bulletin*, 1949, v. 46, 445] that the metabolism of *P. gallinaceum* from infected chickens, treated intravenously with 20 mgm. quinine base per kilo 24 hours earlier, was considerably altered, and suggested that the drug inhibited pyruvate oxidation. In the present investigation chickens similarly infected were treated as above with quinine and the effect on the metabolism of the parasites, in this case freed from red cells, was studied. For this purpose infected blood was obtained from chickens by cardiac puncture and the host cell was lysed by means of haemolytic serum from immunized rabbits, as described by SPECK *et al.* [this *Bulletin*, 1946, v. 43, 1116]. The methods used for the quantitative determination of the various metabolites are described. Respiration measurements were made in a Barcroft-Warburg apparatus at 40°C. over a period of 1 hour. To facilitate maximum rate of oxidation of pyruvate, minute amounts of C4-dicarboxylic acids were added. As in earlier work by the author, metabolic changes are recorded as micromoles per 10^{10} square μ of parasite surface per hour. It was found that free parasites from a quinine-treated chicken converted glucose to lactate at a normal rate but that the rate of oxidation of pyruvate was reduced to about half the rate observed in free parasites from untreated chickens. Previous experiments with *P. gallinaceum*, within red cells, had indicated that

pyruvate could be reduced to lactate, oxidized to CO_2 and water as in the Krebs tricarboxylic acid cycle or oxidized to acetate and CO_2 as indicated in the accompanying diagram.



In the case of free parasites, half the pyruvate oxidized is utilized *via* the above cycle and half gives rise to acetate. The products were present in similar proportions from free parasites treated with quinine, both reactions being equally inhibited. When malonate was present the conversion of pyruvate to acetate was almost complete as the above tricarboxylic acid cycle was inhibited. Quinine and malonate thus inhibit pyruvate oxidation in different ways. Quinine appears to exert its effect through preventing the formation of the postulated reactive 2-carbon-particle (indicated in the above diagram) in the early stage of pyruvate oxidation. Other acids taking part in the cycle were less affected by quinine. When 3 intravenous doses of 20 mgm. quinine per kilo were administered to chickens, inhibition of glucose and pyruvate metabolism in the free parasites was almost complete and the oxidation of acids taking part in the tricarboxylic cycle was greatly reduced.

J. D. Fulton

TRYPANOSOMIASIS

BÜLBRING, Edith, LOURIE, E. M. & PARDOE, Ursula. **The Presence of Acetylcholine in *Trypanosoma rhodesiense* and its Absence from *Plasmodium gallinaceum*.** *Brit. J. Pharmacol. & Chemotherapy.* 1949, Sept., v. 4, No. 3, 290–94, 4 figs.

Acetylcholine has been identified as a normal constituent of *Trypanosoma rhodesiense.* This was done by centrifuging the trypanosomes and blood corpuscles of the pooled blood of 6 heavily infected rats, suspending the cellular material in an appropriate amount of Ringer solution, and finding that the suspension gave positive results in four pharmacological tests for acetylcholine, as follows: (i) contraction of the frog rectus muscle, (ii) contraction of guinea-pig ileum, (iii) inhibition of heart beat in the perfused frog heart, and (iv)

diminution of blood pressure in the spinal cat. Since quantitative observations indicated the same amount of acetylcholine in each of these four tests, the possibility of the reactions having been produced in some non-specific manner is negligible, and since blood corpuscles contain no acetylcholine it is beyond doubt that the substance was present in the trypanosome cells.

Since it is most unlikely that trypanosomes absorb preformed acetylcholine from some organ or body fluid of the host, experiments were performed to show that they can themselves synthesize this substance. The technique employed was that described by FELDBERG and MANN (*J. Physiology*, 1946, v. 104, 411) for the demonstration of acetylcholine synthesis by brain tissue, except that trypanosome material was used instead of brain tissue.

Similar investigations with *Plasmodium gallinaceum* failed to reveal that this organism contains, or is able to synthesize, any acetylcholine.

Acetylcholine is intimately concerned in a variety of motor mechanisms in widely diverse animal species, and the tentative suggestion is therefore made that its presence in trypanosomes and its absence from malaria parasites may be associated with the fact that the former are highly active motile organisms while the latter are relatively immobile. *E. M. Lourie*

WILSON, E. Joan & WORMALL, A. **Studies on Suramin (Antrypol : Bayer 205). 7. Further Observations on the Combination of the Drug with Proteins.** *Biochem. J.* 1949, v. 45, No. 2, 224–31. [25 refs.]

It is well established that suramin (antrypol, Bayer 205) combines with plasma proteins, or with other proteins such as casein or gelatin. When mixtures of suramin and serum are slightly acidified, heavy precipitates are formed which contain large amounts of the drug. If such precipitated complexes are dissolved at *p*H 7·5 and then re-precipitated by acid, the sequence being repeated many times, no decrease is observed in the suramin-content of each successive precipitate. The amount of suramin combining with serum (or other) proteins is not necessarily the same as that present in the suramin-protein complexes of precipitates produced by treatment with acid, and much more suramin is combined with serum in acid solutions than at *p*H 7·5.

DEWEY and WORMALL [this *Bulletin*, 1949, v. 46, 337] found that suramin does not pass into red blood cells. This must be due to its inability to penetrate the cell membrane and not to lack of combining power with haemoglobin or stroma protein, for the drug combines readily with the proteins of haemolysed red cells.

An intravenously injected suramin-protein complex is not retained in the blood any longer than an equivalent amount of suramin injected in an ordinary solution.

The chemical nature of the combination between suramin and proteins remains obscure, although there is sound evidence for believing that it is the drug's sulphonic acid groups which are primarily involved in this combination. The combination is likely to be with basic groups of the protein, but it is unlikely to be with amino groups, because mustard gas sulphone (di-2-chloroethyl sulphone), which blocks the amino groups of gelatin or serum protein, does not limit the power of these substances to combine with suramin. Also a reaction with thiol groups can be excluded, since suramin does not reduce the thiol reaction of cysteine and related compounds, and it is not a general poison for thiol enzymes.

It is probably the combination of the drug with body proteins which accounts for its long retention after injection. The free drug is probably slowly and

continuously released during this long period of time, perhaps by hydrolysis of the protein of the complex, thus enabling the drug to exercise its long-continued prophylactic effect against trypanosomiasis.

E. M. Lourie

FLOCH, H. & ABONNENC, E. Sur une nouvelle trypanosomiase humaine américaine. [**A New American Trypanosome Infection in Man.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 7/8, 394–400. [17 refs.]

The exact degree of pathogenicity of *Trypanosoma rangeli* still remains to be determined and even its identity with several described or partly described species is in some doubt. In this paper there is an attempt to disentangle some of the problems. *T. rangeli* was first described by TEJERA in 1920 from the intestinal contents of *Rhodnius prolixus* ; PIFANO *et al.* [this *Bulletin*, 1948, v. 45, 1072 ; 1949, v. 46, 923] described in 1948 human and canine infections with this organism (with a nuclear index of 1·8) in Venezuela. Various authors in Central and South America have recovered the trypanosome either in pure strain or mixed with *T. cruzi*, from triatomid bugs ; and also from blood culture and by means of xeno-diagnosis. In Guatemala it was isolated from the blood of young children and named *T. guatemalense* (nuclear index 1·4). Other strains were studied by the present authors in French Guiana from monkeys (*Cebus*), ant-eaters (*Myrmecophaga tridactyla*) and opossums. The strains varied in morphology according to the mammal involved, and from vertebrate to invertebrate host, and also according to the length of time the infection lasted. The authors conclude by stating that it is impossible at present to be certain that all the trypanosomes recovered from naturally infected bugs necessarily belong to one species (*T. rangeli*). It is also impossible so far to be certain that the trypanosomes found in the mammals are all *T. rangeli*. If a single species only is concerned, then the correct sequence of events was as follows :—

1. Discovery in the bug by TEJERA in 1920.
2. Discovery in the ant-eater by FLOCH *et al.*, in 1941.
3. Discovery in man by DE LEON and MONTENEGRO in 1943.

P. C. C. Garnham

TALICE, R. V. **The Chagas' Disease of Uruguay.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1949, Sept., v. 43, No. 2, 107–9. Discussion 110–12 [SHORTT, H. E. ; MANSON-BAHR, P. ; FULTON, J. D. ; HOARE, C. A. ; HACKETT, C. J. ; TALICE (in reply)].

Prof. Talice gives a brief account of Chagas's disease in Uruguay, which is endemic wherever its chief vector, *Triatoma infestans*, occurs. Though only about 400 cases have been definitely confirmed, 3,000 others were suspected to be suffering from trypanosomiasis, while the employment of xenodiagnosis in surveys has shown that 8 per cent. of the children harbour trypanosomes in their blood, without showing any clinical symptoms. The mortality is below 10 per cent. From these data it is evident that the incidence of infection in Uruguay is higher than the available figures indicate.

In young children and in adults infected for the first time, the disease runs an acute course ; in others it is usually benign, and it is thought that frequent exposure to infection produces a state of premunition in many persons. A certain proportion of acute cases show cardiac manifestations which might terminate fatally.

Among the diagnostic methods, examination of stained thick blood films is especially recommended ; xenodiagnosis is also used, but the cultural method

and inoculation of mice or pups is of little practical value; the complement fixation test (Guerreiro-Machado reaction) is advisable in chronic cases, but the technique is not yet standardized.

The only available drugs for the treatment of Chagas's disease, Bayer 7602 and Eagle's 70–A, are useful in suppressing acute symptoms in young children but do not free the blood of trypanosomes.

Though Gammexane has been used effectively against the triatomid vectors, the substitution of modern buildings for the primitive rural dwellings is regarded as a more important preventive measure against the spread of the disease.

The author was unable to confirm the alleged inhibitory action of *T. cruzi* in cancer, four advanced cases of which were inoculated with this trypanosome without showing any improvement. The paper was illustrated by a film.

In the discussion which followed, Prof. Shortt enquired about the stages of the bug used for xenodiagnosis and the length of time elapsing before the infection can be detected in the insect. Dr. Fulton stated that in experimental infections of mice Bayer 7602 cleared the blood of trypanosomes but did not affect the leishmanial forms in the tissues; he also referred to another German drug for the treatment of Chagas's disease, Bayer 9736 (A5). Dr. Hoare asked whether reservoirs of the disease were present among the wild animals in Uruguay.

In reply, Prof. Talice stated that a thick film may be positive 2–3 months, and xenodiagnosis up to several years after the onset of the disease. Natural infections with *T. cruzi* occurred in opossums and in pups within the endemic region. There was at present no reliable curative drug against Chagas's disease.

C. A. Hoare

TALICE, R. V. Recherches sur la maladie de Chagas en Uruguay. [**Researches on Chagas's Disease in Uruguay.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 7/8, 352–4.

At a meeting of the *Société de Pathologie exotique* held in May, 1949, the author showed a film on Chagas's disease, made at Monte Video, and reported the results of work done on this disease between 1937 and 1949. Five points are dealt with :—

i. *The Epidemiological aspect.*—There are two species of *Triatoma* common in the country; *T. infestans* and *T. rubrovaria.* In the laboratory hybrids can be obtained by crossing these. The endemic area of Chagas's disease is that of the distribution of the former—a hyperendemic zone in the north-west and below it a "subendemic" zone. The total number of human cases is now nearly 400 (almost certainly much greater) and some 3,000 "probable cases" have been examined; the fatality rate is less than 10 per cent. Xenodiagnostic tests on [number not stated] children taken haphazard showed 8 per cent. of them to be carrying the trypanosome. Since many of them showed no symptoms, clinical or electrocardiographical, the total is certainly higher, than this.

ii. *The Clinical aspect.*—Most of the cases diagnosed are the acute, with palpebral oedema (Romaña's sign), but, in the author's opinion, the non-oedematous, with no indication of the portal of entry, are more common, though difficult to recognize. The severity depends on age; the course of acute forms is usually benign, except in primary infection of adults.

iii. *The Laboratory aspect.*—The thick drop is the best, or most convenient method of diagnosis, or Errecart's modification of mixing 3–4 drops of blood

with one of physiological saline with 1 per cent. formol by which the trypanosomes retain their typical form. Xenodiagnosis is good, but slow ; cultivation is not very practicable, animal inoculation (into mice or puppies) has a restricted application. The Guerreiro-Machado reaction is best in chronic cases, but the technique should be standardized.

iv. *The Therapeutic aspect.* 7602 Bayer, an acridine derivative, and Eagle's para-arseno-phenyl-butyric acid are highly spoken of as saving the lives of young children attacked by severer forms of the disease, in spite of the fact that they do not sterilize the blood, since xenodiagnostic tests remain positive.

v. *The Prophylactic aspect* includes the use of DDT and Gammexane and improvement of dwellings. *H. Harold Scott*

DIAS, E. Os riscos da propagação da doença de Chagas pelos serviços de transfusão de sangue. [**Risks of propagating Chagas's Disease in Blood Transfusions.**] *Bol. Oficina Sanitaria Panamericana.* 1949, Sept., v. 28, No. 9, 910–11. English summary.

This note stresses the danger of Chagas's disease being propagated by infected blood donors, even though they were apparently in good health. The author advocates the systematic application of xenodiagnosis and adequate blood tests of the prospective donor. Reference is made to the findings of PELLEGRINO [this *Bulletin*, 1949, v. 46, 813]. *H. J. O'D. Burke-Gaffney*

PELLEGRINO, J. Doença de Chagas em doadores de sangue. [**Chagas's Disease in Blood Donors.**] *Bol. Oficina Sanitaria Panamericana.* 1949, Sept., v. 28, No. 9, 912–14. [11 refs.] English summary.

This additional note amplifies the arguments of the previous writer. In case of emergency transfusions, where Chagas's disease cannot be excluded, the blood of those only should be used who have never been exposed to the infection. The complement fixation reaction is to be preferred to the methods of aetiological diagnosis : it produces more rapid results and the latter methods are positive only in a small percentage of cases in chronic infections.

H. J. O'D. Burke-Gaffney

LEISHMANIASIS

AMALFITANO, G., BENETAZZO, B., CIFARELLI, F., GAMBINI, G., SERVINO, V. & TARIZZO, M. La leishmaniosi viscerale nella piana di Fondi (Latina). (Relazione delle prime ricerche epidemiologiche e cliniche.) [**Visceral Leishmaniasis in the Fondi Plain, Italy.**] *Arch. Ital. Sci. Med. Colon. e Parassit.* 1948, Feb., v. 29, Nos. 1/2, 1–14.

During the year ending April, 1947, the authors had under their observation five cases of kala azar in children from three to seven years of age. In each the earliest symptoms were periodic fever, malarial in type, which yielded to treatment with quinine. This was followed by typical symptoms of visceral leishmaniasis—abdominal enlargement, anaemia, positive serological reactions and positive findings from the marrow and from the spleen puncture.

The Fondi plain is of alluvial soil, partly occupied by a lake and below sea-level, partly cultivated. The findings of the cases referred to led to more investigation and 1,365 children between seven and fifteen years attending the local

schools were examined, 743 boys and 622 girls ; 105 of the former and 131 of the latter had enlarged spleens. Next, the homes were visited and 746 children of pre-school age were examined ; 20 had enlarged spleens. This led to examination of others, some children, some adults, and more positives were found. Notes of eight are given—not enough to say that the disease is present in epidemic form, but it is believed that the timely use of DDT has prevented its becoming epidemic. *H. Harold Scott*

TRIPODI, P. " Sui rapporti tra leishmaniosi viscerale e malaria ". Descrizione di tre casi clinici. [**The Relation between Kala Azar and Malaria. Three Clinical Cases.**] *Arch. Ital. Sci. Med. Colon. e Parassit.* 1948, Feb., v. 29, Nos. 1/2, 24–38. [27 refs.]

The author describes in some detail three cases in which fever, malarial in character and in nature, proved by finding the parasites, was followed by, or accompanied by, the signs of visceral leishmaniasis, also proved by finding leishmania in the blood or puncture fluid from the spleen or bone-marrow.

On the basis of these cases the author poses the following questions : i. Can a person contract the two infections at the same time ? ii. Can a person suffering from malaria contract leishmaniasis ? iii. Is there any antagonism between the two ? He then quotes RUTELLI's experiments of injecting children suffering from kala azar, or inoculated subcutaneously or intravenously with a culture of leishmania, with malaria parasites, and his failure to obtain any positive results which led him to conclude that there existed a vital antagonism between them. Also FONZO who examined 271 malaria patients and 85 kala azar patients in a known kala azar area of Palermo and did not find one in which the two were present together. Again, PARADISO, between 1910 and 1925, examined 1,132 patients and found the two infections associated in one only. Other authors are quoted, *e.g.*, MARTHUS and BRAHMACHARI among them, who concluded that the association did occur, but it was rare, while CASTELLANI, JACONO and others have affirmed their frequent coexistence, particularly in India. *H. Harold Scott*

ECKER, H. D., AMBURY, J. F. & ROBINSON, Lucille B. **Report of a Case of Kala-Azar Relapsing after Two Years.** *Amer. J. Trop. Med.* 1949, Sept., v. 29, No. 5, 707–10. [18 refs.]

A white male, aged 32 years, was admitted to a hospital in Washington, D.C., on November 2nd, 1947.

He had served in the China-Burma-India area from 1943 to 1945. In February and March, 1945, he had two short febrile attacks diagnosed as dengue. In May 1945 he had a recurrence of fever and after sternal punctures the condition was diagnosed as kala azar : he was given 3·8 grammes of Neostam and he made an uneventful recovery. On his return to the States he was admitted to the Moore General Hospital in October 1945 for a routine examination, but was " discharged without evidence of disease ".

He remained in good health until June 1947 when he appeared to have febrile attacks, but he carried on his work until the end of October when his temperature was found to be 104°F. and he suffered considerable malaise. He had lost 12 lb. in weight. The spleen was 8 cm. below the costal margin and the liver 7 cm. The first sternal puncture (smear only examined) was negative : a second also was negative in the smear, but *Leishmania donovani* grew in NNN culture medium after eleven days' incubation. In a second tube, to which 2·5 ml. of penicillin (200 units per ml.) had been added, it grew in eighteen days. The diagnosis was further established by a positive splenic puncture.

The patient was given two courses of Neostibosan of 3·9 gm. each. He made a complete clinical recovery and was known to be well seven months after the completion of the last course of treatment. *L. E. Napier*

NAPIER, L. E. **The Rate of Disappearance of *Leishmania* in Kala-Azar Patients under Urea Stibamine Therapy.** [Correspondence.] *Trans. Roy. Soc. Trop. Med. & Hyg.* 1949, Sept., v. 43, No. 2, 231–33.

In a letter, the writer challenges a number of the statements and conclusions of HO, SOONG and LI [this *Bulletin*, 1949, v. 46, 815]. He points out that most of the earlier workers from 1920 onwards did not depend on "clinical impressions" but used parasitological methods of testing cure, and that furthermore they supplemented the examination of smears by cultural methods; this the above authors did not do. But he also points out the limitations of the parasitological criterion of cure; he himself had found that immediate post-treatment spleen or liver puncture gave no true indication of whether the patient was cured or not.

He questions the conclusion that weekly injections of urea stibamine are more effective than twice weekly, not only from his own experience but because he considers that the authors' figures can be otherwise interpreted. The time factor may be the important one since their figures show that the longer the interval from the beginning of treatment the lower the positive-smear rate, irrespective of the frequency of the injections.

It is not clear what cases were taken into consideration in calculating the relapse rates of 1·3 and 4·1 for patients who had weekly and twice-weekly injections, respectively, since there are discrepancies in the figures given.

Finally, the three recommendations made by the authors are not in any way supported by the data presented. *L. E. Napier*

ROMAÑA, C., NÁJERA, L., CONEJOS, M. & ABALOS, J. W. I. Leishmaniosis tegumentaria en perros de Tucuman. II. Foco domestico de leishmaniosis. [**Cutaneous Leishmaniasis in Dogs in Tucuman.**] *An. Inst. Med. Regional.* Tucuman, Argentina. 1949, Aug., v. 2, No. 3, 283–92, 5 figs.

"1. The authors report the finding of dogs infected with cutaneous leishmaniosis, in the province of Tucumán. The anatomicopathological description of the lesion is given.

"2. A domestic focus of cutaneous leishmaniosis has been found in the Department of Burruyacu (Tucumán), 4 out of 5 dwellers of a "rancho" having been found infected, as well as 2 dogs of the same house. In the immediate surroundings of the house there were discovered numerous specimens of *Phlebotomus cortelezzii* in hollow trees and on a horse."

FEVERS OF THE TYPHUS GROUP

SADUSK, J. F., Jr. **The Immunization of Troops with Typhus Vaccine and the Characteristics of Typhus in Immunized Individuals.** *Yale J. Biol. & Med.* 1949, Jan., v. 21, No. 3, 211–32, 3 figs. [29 refs.]

This is a critical review of the official records dealing with the incidence of fevers of the typhus group in the U.S.A. Army during the years 1942–1945.

The total numbers of cases of each type were as follows; the yearly incidence *per mille* is shown in brackets.

(1) Epidemic typhus, 64 (0·003); all the cases occurred in Europe, Africa, and the Middle East. There were no deaths, and it was believed that the Cox-type, ether-extracted, vaccine might have caused a definite lowering of the incidence and that it eliminated the risk of death among persons adequately immunized at least two weeks before exposure to infection. Among vaccinated persons the complement-fixation test could not be relied on to differentiate between epidemic and murine typhus.

(2) Murine Typhus, 603 (0·025). Most of these cases occurred in the U.S.A. and Pacific Ocean areas; apart from these there were only 13 cases, all in Latin America.

(3) Scrub Typhus, 6,685 (0·27), of which 967 occurred in the China-India-Burma area, and the rest (3·34) were in the South-West Pacific area.

John W. D. Megaw

PRAŻMOWSKI, W. Warunki meteorologiczne, towarzyszące nasilaniu się duru plamistego. [**Meteorologic Conditions in relation to Typhus Fever.**] *Przeglad Epidemiologiczny.* Warsaw. 1948, v. 2, Nos. 3/4, 241–56.

The English summary appended to the paper is as follows :—

" Ten years observations in prevalence of typhus fever is discussed in relation to meteorologic conditions. The author stated a positive correlation of typhus fever rate to the mean daily temperature, humidity and insolation. At the beginning of a typhus fever outbreak usually a low temperature and small variations of the daily maximum and minimum temperature were found. During that period also a high humidity and low insolation prevailed. At the end of an outbreak or during intermissions reversed conditions were observed. Low moisture favours the typhus fever rate. No influence of atmospheric pressure could be stated. A study of the weekly typhus fever incidence does not show a correlation to the meteorologic changes."

KRYŃSKI, S. & CZUCZWAR, S. Badania nad działaniem fenolu na Rickettsje prowazeka. [**Action of Phenol Solution on** *Rickettsia prowazeki*.] *Przeglad Epidemiologiczny.* Warsaw. 1948, v. 2, Nos. 1/2, 86–97.

The English summary appended to the paper is as follows :—

" In the course of our investigations we found that 0·2–0·5% phenol solution is toxic for lice when injected intrarectally. Not all lice are killed. In some part there are temporary paralyses of the nervous system. In the temperature +34°C. a smaller percentage of lice perish than in +20°C.

" In investigations on the action of phenol solution on *R. prowazeki* we divided our experiments into 3 groups :

" 1. Influence of phenol solution on *R. prowazeki* in suspension of crushed infected intestines of lice. 0·5% phenol solution kills *R. prowazeki* in 1 hour. 0·05% phenol solution kills *R. prowazeki* in 24 hours. 0·1–0·2% phenol sol. kills rickettsiae partially in 1 hour, 0·3–0·4% phen. sol. kills in 1 hour almost all rickettsiae. Under the influence of 0·2–0·3% phen. sol. giant forms of *R. prowazeki* (about 5 u. long) may appear. Under the influence of 0·1–0·2% phen. sol. the toxic activity of concentrated *R. prowazeki* suspensions diminishes. This loss of toxicity is not due, as some authors believe, to the destruction of endotoxin, but rather is in connection with the diminishing rate of living rickettsiae in the treated suspension.

" 2. The action of phenol solution on *R. prowazeki* contained in isolated lice intestines is analogous with the action of phenol sol. on *R. prowazeki* suspension.

" 3. Lice plunged in 0·5% phenol sol. keep their infective properties 72–96 hours."

FULLER, H. S., MURRAY, E. S. & SNYDER, J. C. **Studies of Human Body Lice, *Pediculus humanus corporis*. I. A Method for Feeding Lice through a Membrane and Experimental Infection with *Rickettsia prowazeki*, *R. mooseri*, and *Borrelia novyi*.** *Pub. Health Rep.* Wash. 1949, Oct. 14, v. 64, No. 41, 1287–92.

The authors have had success in the artificial feeding of lice by a method of which they give technical details. The principle involved was the use of a membrane prepared from a chick of one to seven days old ; this was stretched over one end of a cylinder of glass or other substance so as to form a water-tight tube into which the lice were introduced. When the membrane was dipped into blood or other suitable fluid the lice fed readily, and it was possible to maintain a colony of healthy lice for two weeks and to establish rickettsial and spirochaetal infection in lice without the employment of direct human blood donors.

The application of the method to the study of various infections transmitted by lice is being studied.

The chief drawback of the method is the difficulty of sterilizing the skin of the chicks. Those directly interested will find in the paper a description of the technique employed. *John W. D. Megaw*

BOCCIA, G. Le alterazioni delle coronarie nel decorso del dermotifo. **Changes in the Coronary Arteries in Typhus Exanthematicus.** *Acta Med. Italica.* 1949, Sept., v. 4, No. 9, 235–9, 3 figs. [12 refs.] English summary (9 lines).

TOMASZEWSKI, L. Ogólne odczny poszczepienne przy uodparnianiu szczepionka według Weigla w zakładzie produkcji Szczepionki przeciw Durowi Plamistemu im R. Weigla w Lublinie. **General Reactions after Weigl's Typhus-Vaccination.** *Przeglad Epidemiologiczny.* Warsaw. 1948, v. 2, Nos. 1/2, 98–109. [13 refs.]

The English summary appended to the paper is as follows :—

" The Institute of Production of vaccine against typhus fever of Prof. Weigl in Lublin was established in December 1944 shortly after the retreat of German Forces: Owing to lack of supplies of vaccine, which was very difficult to obtain from abroad the staff was not immunised against typhus fever for a period of nearly three months, that is till time of production of own supply of vaccinations.

" During this period the staff was in immediate contact with lice and rickettsia through the surface of skin and mucous membranes on which settled the excrements of lice spread everywhere in Institute. The contents of saliva glands of lice was introduced into the blood stream of the feeders of lice during the actual feeding.

" Due to the shortage of material the first portions of vaccine were made of the intestines of the lice with addition of the liquid in which the bodies of lice had been washed. Under normal conditions this liquid is not used for manufacturing of vaccine.

" 77 people were vaccinated with this imperfect vaccine including many with exposition to lice antigen. Besides 423 were vaccinated with normal vaccine. 11 severe and 5 light general reactions were observed after the injections. The study of this reaction brought following conclusions :

" 1. Severe general reactions obtained at the immunisation against typhus fever according to Weigl's method in the Lublin Institute were caused by : *a*) supersensitiveness caused by specific conditions.

" *b*) use of vaccine containing great amount of lice antigen. The number of reactions registered under *a*) and *b*) was 9, which in comparison with 77 people vaccinated with the imperfect vaccine amounts to 11·6%, and in comparison with the whole 500 vaccinated people amounts to 1·8%.

" 2. The total number of reactions out of 500 cases vaccinated in Lublin Institute was 16 (3·20%). When applying the normal vaccine there were 4 reactions out of 423 (0·94%), including 2 severe general reactions (0·47%). One of them was very exceptional (70 year old man). Therefore one draws a conclusion that the number of general reactions in cases of immunised people according to Weigl balances between 0·24%–0·70%.

" 3. Persons with liver diseases may be susceptible to severe pathological reactions.

" 4. In old age there is great possibility that the pathological reaction may be provoked by vaccination.

" 5. The average time of breaking out of symptoms is 20–30 minutes.

" 6. Practical directions :

" *a*) Carrying out an interrogation—before the immunisation—as to the liver diseases if any or as to other sensibilisation.

" *b*) In cases of heart diseases or in cases mentioned under *a*) it is advisable to apply the desensibilisation method of Bezredka."

TRAVASSOS, J., RODRIGUES, P. M. & CARRIJO, L. N. Tifo murino em São Paulo. I. Identificação da *Rickettsia mooseri* isolada de um caso humano. [**Murine Typhus in São Paulo. I. Identification of *Rickettsia mooseri* in a Human Case.**] *Mem. Inst. Butantan.* 1948, v. 21, 77–106, 3 pls. (1 coloured) & 2 graphs. [28 refs.] English summary.

The authors describe in detail what they claim as being the first " sure identification " of *Rickettsia mooseri* in Brazil.

The guineapigs used in the isolation of the rickettsiae showed no signs of scrotal reaction till the third passage, after which the reaction rapidly became more pronounced and remained consistently severe in later passages.

By all the standard tests, including cross-immunity reactions, the organisms were found to be similar to the Wilmington strain of *R. mooseri*.

John W. D. Megaw

SCAFFIDI, V. & CALI', G. Il quadro ematico nel tifo esantematico di genesi murina. [**The Blood Picture in Murine Typhus.**] *Acta Med. Italica.* 1949, Sept., v. 4, No. 9, 225–9. [51 refs.] English summary.

The types of leucocyte count observed in 55 cases of murine typhus in East Sicily are described. Between the eighth day and defervescence 57 per cent. of the cases showed no important change in the total count, but there were moderate degrees of lymphocytosis and granulocytopenia, sometimes also monocytosis. In 18 per cent. there were leucopenia, lymphocytosis and monocytosis. In the remaining 25 per cent. there was a moderate degree of neutrophile granulocytosis.

During early convalescence the total white-cell count gradually returned to normal and a pronounced increase in the lymphocytes and monocytes was observed.

The paper includes a useful summary of the literature dealing with the blood picture of louse typhus, and a bibliography with about 50 references is appended.

In the English summary there is an unhappy misprint in which louse typhus is shown as " house typhus ", and the reader will be puzzled by such terms as " the ematic peripheric picture " and " piastrins ". *John W. D. Megaw*

GISPEN, R., SMIT, A. M. & WESTERMANN, C. D. Epidemische Scrubtyphus in Batavia. [**Epidemic Scrub Typhus in Batavia.**] *Med. Maandblad.* Batavia. 1949, Aug. 1, v. 2, No. 8, 238–46, 1 map. [12 refs.] English summary.

See this *Bulletin*, 1949, v. 46, 1024.

SMADEL, J. E., WOODWARD, T. E., LEY, H. L., Jr. & LEWTHWAITE, R. **Chloramphenicol (Chloromycetin) in the Treatment of Tsutsugamushi Disease (Scrub Typhus).** *J. Clin. Investigation.* 1949, Sept., v. 28, No. 5, Pt. 2, 1196–215, 6 figs. [23 refs.]

This is a comprehensive description of the work carried out by the authors on the use of chloromycetin in the treatment of scrub typhus. To a large extent it extends and confirms the evidence already brought forward in previous articles. [See, for example, this *Bulletin*, 1949, v. 46, 27, 1025.]

The authors have now had experience of the treatment of 69 cases of the disease and they confidently corroborate the view already expressed that the drug has a powerful rickettsiostatic effect in nearly every case. They further discuss the significance of the frequent occurrence of relapses among patients who were attacked after having received a course of treatment during the period of exposure to special risk of infection. They point out that in these cases the curative treatment was started very early in the course of the fever. From a table it appears that the three patients whose attacks were most prolonged through the occurrence of relapses had received their treatment within the first two days of the illness, so it is easy to agree with the authors' suggestion that the rickettsiostatic effect of the drug might have worn off before the immunizing mechanism of the body had become adequate to suppress the further development of rickettsiae which survived the course of treatment. It seems likely that in several cases an earlier cure would have occurred if the treatment had been delayed for two or three days or if two or more courses of treatment with smaller doses had been given. The number of cases in which this minor problem of dosage will arise is likely to be small, and the absence of a single fatality in 69 cases is indeed a triumph.

One observation deserves special mention ; a patient with a total leucocyte count of 1,700 per cm. suffered no ill effect from the treatment, in fact his count had risen to 4,200 before his discharge from hospital.

John W. D. Megaw

PAYZIN, S. Türkiyede Q Hummasi Epidemiyolojisi. [**Epidemiology of Q Fever in Turkey.**] *Türk Ijiyen ve Tecrübi Biyoloji Dergisi.* Ankara. 1949, v. 9, No. 2, 101–10. [In English pp. 111–20, 2 figs. (32 refs.)]

The results of complement-fixation tests carried out by the author and others suggest that Q fever is endemic all over the country among human beings, sheep, goats and cattle.

Among 127 sera sent for the Wassermann test there were 14 reactions, at titres ranging from 1–10 to 1–40. Among 741 sera from pneumonia patients there were 188 reactions at titres of 1–10 to 1–320 ; there were 68 reactions at titres of 1–80 and over.

An analysis of 98 positive reactions showed that 57 occurred among farmers and " animal contacts ".

No immunological differences were found between strains of *Rickettsia burneti* isolated in Ankara, Izmir, and Morocco. *John W. D. Megaw*

PAYZIN, S. La Q Fever en Turquie. [**Q Fever in Turkey.**] *Arch. Inst. Pasteur du Maroc.* 1949, v. 4, No. 1, 13–18. [12 refs.]

DODDANANJAYYA, R. **Incidence of Q Fever in Eastern Washington. A Serological Survey.** *Pub. Health Rep.* Wash. 1949, Sept. 30, v. 64, No. 39, 1230–36. [15 refs.]

Sera of 289 persons living in the eastern part of Washington State (North-West, U.S.A.) were tested ; six gave positive complement fixation reactions at titres of 1–8 to 1–128 with Q fever antigen.

An unstated number of the sera were from students of the State Veterinary College, and of these three reacted at titres of 1–32, 1–64, and 1–128 respectively ; all had been in close contact with cattle, and all gave a history of recent illness which might have been Q fever.

Sera of 327 cattle were tested ; nine of these reacted at titres ranging from 1–8 to 1–128. The author's comment is " The disease appeared to be present in the beef herd and absent from the dairy herd " ; the latter had not been out to pasture and so had not been exposed to tick infestation.

John W. D. Megaw

PARKER, R. R. & SUSSMAN, O. **Spontaneous Infection of the Brown Dog Tick, *Rhipicephalus sanguineus* with *Coxiella burnetii*.** *Pub. Health Rep.* Wash. 1949, Sept. 9, v. 64, No. 36, 1159–60.

From a suspension made from 18 specimens of *Rhipicephalus sanguineus* collected from a dog in Phoenix, Arizona, in June, 1948, the authors have isolated *Coxiella* [*Rickettsia*] *burneti*.

This is said to be the first time that *R. sanguineus* has been reported as being spontaneously infected. *John W. D. Megaw*

BLANC, G., MARTIN, L. A. & BRUNEAU, J. Q Fever expérimentale de quelques animaux domestiques. [**Experimental Q Fever in certain Domestic Animals.**] *Ann. Inst. Pasteur.* 1949, Aug., v. 77, No. 2, 99–107, 2 figs. & 2 graphs. [Refs. in footnotes.]

Successful inoculation with Q fever has been carried out in a heifer, a young bull, two dogs, a young camel, and two kids.

In most cases the inoculation was by the subcutaneous route ; the materials used were : (*a*) suspensions of infected ticks, (*b*) organs of infected guineapigs or (*c*) infected yolk sacs.

The evidence of infection consisted in the occurrence of febrile attacks after an incubation period which was usually one to three days, and positive reactions in guineapigs inoculated with the blood of the infected animals. Rickettsia-agglutination tests gave positive results in five of the six animals which were tested. Complement-fixation tests are mentioned in connexion with only two of the animals, the highest titre obtained was 1–8. *John W. D. Megaw*

YELLOW FEVER

CERQUEIRA, N. L. & BOSHELL-MANRIQUE, J. **Note on *Haemagogus spegazzinii* Brèthes, 1912 (Diptera, Culicidae).** *Proc. Entom. Soc. of Washington.* 1946, Nov., v. 48, No. 8, 191–200, 10 figs. [Summary taken from *Rev. Applied Entom.* Ser. B. 1949, July, v. 37, Pt. 7, 143–4.]

As it was important to determine whether specimens of *Haemagogus capricorni*, Lutz and *H. spegazzinii*, Brèth., from the type areas corresponded exactly to supposedly similar material from Bolivia, Cerqueira & Lane obtained

specimens of *H. capricorni* from the type locality in Brazil and published detailed descriptions of them, and in this paper descriptions are given of the adults of both sexes (including the male genitalia) and larva from material bred from females of *H. spegazzinii* from the type locality in Argentina and from Brazil (Cururipe and Ilhéus in Bahia and Arado in Mato Grosso). There was a close similarity between the specimens of *H. spegazzinii* reared from females from the type locality and those described originally by Brèthes as well as others described subsequently by Shannon & Del Ponte in a work already noticed ; and comparison with specimens of both sexes from Brazil and Bolivia showed conclusively that all belong to the same species. It was also found that examples collected recently at Cururipe were identical with earlier material found by Antunes & Whitman to transmit yellow fever there and recorded by them as *H. janthinomys*, Dyar, which is a synonym of *H. spegazzinii*. The fact that *H. spegazzinii* was the only species of this genus found in Ilhéus and Arado where yellow fever is endemic, and more recently (1945) in Goiaz, where epidemics of yellow fever have occurred, suggests that it is probably a vector in those localities.

RABIES

BOECKER, E. Zur Bewertung von Wutschutzbehandlungsverfahren. I. [**Evaluation of Methods of Inoculation against Rabies.**] *Zent. f. Bakt.* I. Abt. Orig. 1948, Jan. 7, v. 152, No. 5, 303–16. [11 refs.]

This is a Festschrift contribution to Professor Otto Lentz on the seventy-fifth anniversary of his birthday. The author does not discuss, as one might expect from the title of his paper, the relative values of the different methods of inoculation and the preparations used, but general principles on which such evaluation should be based.

Since the period of incubation between infliction of the wound and the onset of symptoms is so wide, ranging from a week to a year, and, yet further, a considerable number of persons bitten by a rabid animal may never develop symptoms at all, we cannot say for certain how many of those who submit to preventive inoculation would suffer from the disease if they had not been inoculated. Van Stockum has stated that the value of a procedure can be gauged only by a consideration of those cases which occur in spite of early treatment, that is, treatment begun within a week of infliction of the bite. An arbitrary period of 30 days was taken as the limit between early and late cases, *i.e.* those showing symptoms within 30 days are called " early cases " and those not showing symptoms until 31 days or longer, " late cases." The percentage of " late cases " to the whole is designated the S value [Stockum ?].

These criteria are applied to 633 untreated cases of rabies and they are divided into three groups : I. Those bitten on the head or neck ; II. Those bitten on the hand or arm ; III. Those bitten elsewhere on the body or where the site is not certain. Each of these groups is again subdivided into those below and those above 14 years of age.

Of 185 in Group I, 97 were children and 88 adults (*i.e.*, below and above 14 years). Of the children 31 were " early " cases, 61 were " late " cases, while five were borderline (that is, the interval was about 30–31 days) ; this would give an S value of 63 per cent. ; of the 88 adults 14 were early and 72 were late cases, two were borderline, an S percentage of 82. In Group II there were 386, 87 children and 299 adults ; " early " cases were 10 and 19 respectively, " late " cases 75 and 277, while two and three respectively were borderline cases ; these figures give S percentages of 85 and 92 respectively. In Group III

there were 31 of each in the under and over 14 years ; three of the children were " early " cases, one borderline and 27 late ; all 31 of the adults were " late " cases ; the corresponding S percentages are, therefore, 87 and 100.

Summing these up : Of the 215 under 14 years of age, 97 or 45 per cent. belong to Group I, Head and Neck injuries ; of the over 14 years only 88 of 418 were of this group, or 21 per cent. This difference is ascribed as due to the greater likelihood of the children being bitten on the head and neck. Of the total 633, 77 were " early " cases, 13 borderline, and 543, or 85 per cent., " late " cases. [With one exception the percentages as given in the paper have been wrongly calculated.]

The question is important because the ultimate issue is whether the comparatively insignificant reduction of cure in cases treated late, as shown in recorded figures, is due to " selection " which, according to the author, is identical with the complete inactivity of the inoculation, or is actually to be ascribed to the inoculation. *H. Harold Scott*

PLAGUE

PUBLIC HEALTH REP. Wash. 1949, Sept. 9, v. 64, No. 36, 1165. **Plague in New Mexico. Report on Two Cases of Plague in New Mexico in July.**

A boy of 10 in Cerro, Taos County, became severely ill with plague a few days after he and his brother had killed a prairie dog. He recovered on treatment with streptomycin and sulphadiazine.

The second case was that of a farmer of 37 in Placitas, Sandoval County, who had killed some gophers two or three days before he became ill. He had pneumonic involvement, but this may have been an intercurrent infection. He was treated with penicillin and aureomycin and was stated to be recovering a month later.

Typical organisms were reported to have been cultured from specimens from both patients.

In neither case was there evidence of domestic rodents near the localities where the infection was acquired. Plague infection had been reported in fleas from prairie dogs in both counties a few months earlier and in fleas from grasshopper mice in Sandoval County in May 1943. *H. J. O'D. Burke-Gaffney*

SÁENZ VERA, C. La peste en El Ecuador durante el año 1948. [**Plague in Ecuador in 1948.**] *Bol. Oficina Sanitaria Panamericana.* 1949, Sept., v. 28, No. 9, 906–9.

CHOLERA

WEI, Y. **Atmospheric Absolute Humidity as a Factor influencing Cholera Prevalence in Shanghai.** *Chinese Med. J.* Shanghai. 1949, Apr., v. 67, No. 4, 177–83, 3 charts.

In agreement with the observations of ROGERS in India it has been stated by Chun that cholera would seemingly only prevail in any district in China when the absolute humidity is above 0·4 inches (=10 mm. of Hg.). This point has been

examined in relation to the incidence of the disease in Shanghai during the years 1946–48.

In 1946 cholera started at the end of May, reached its peak in July and fell with a sharp crisis in August and ceased by 1st November. The epidemic commenced a few days after the absolute humidity rose above the critical line of 10 mm. of Hg. and continued while it remained above that level. When the absolute humidity began to touch the critical level cases became less and the epidemic ceased when the humidity fell below 10 mm. The total cases reported and confirmed were 4,415.

In 1947 there were only two local cases in August and thereafter a mild outbreak occurred in September and October which produced 53 cases. Absolute humidity was far above the critical level for some time before cases were reported and there was a lapse of time between the rise and the occurrence of the first cases. Cholera again ceased when the absolute humidity fell and stayed below the critical line.

On the basis of the observations in 1946 and 1947 in Shanghai an attempt was made to forecast the likely prevalence of cholera in 1948. In that year the absolute humidity rose above 10 mm. of Hg. on 20th May and did not fall below that level until 6th October. It had previously been observed that the minimum interval between epidemics of high incidence in Shanghai was two years and the maximum eight years. As no cases were reported at the time of the rise, when meteorological conditions would be considered to be favourable, it was expected that 1948 would not be an epidemic year. No cases occurred although the absolute humidity curve assumed its usual form.

The author considers that "from the periodicity and the reaction of the endemic status to the increased humidity at the early part of a year, the forthcoming cholera epidemic can be forecasted."

Certain speculations are made as to how meteorological conditions may affect host-parasite relationship and influence the occurrence of an epidemic.

J. Taylor

AMOEBIASIS AND INTESTINAL PROTOZOAL DISEASES

WESTPHAL, A. Darmprotozoen und ihre Uebertragung in Nordafrika. [**Intestinal Protozoa and their Transmission in North Africa.**] *Ztschr. f. Hyg. u. Infektionskr.* 1948, July 16, v. 128, Nos. 1/2, 56–72, 5 figs. [22 refs.]

During the North African campaign in 1942, the author made a survey of the incidence of infection with *Entamoeba histolytica* and other intestinal protozoa among the German troops, using faecal preparations fixed with Schaudinn's fluid and stained with Heidenhain's iron haematoxylin. The figures showed that the incidence among men who had been in Africa since the summer or autumn of 1941 was much higher than among those who arrived in November 1941 or later. Since the higher degree of infection in the former group corresponded to a veritable plague of flies during the period in question, it would appear that the infections were disseminated chiefly by these insects. In fact, the dissection of flies caught near open latrines in Tobruk revealed in the guts of 30 per cent. the cysts of human intestinal protozoa. In the district east of Mersa Matruh, in addition to the usual intestinal parasites, there occurred infections with *Isospora belli*. Since the presence of animal reservoirs in this locality could be excluded, it is probable that the coccidium was transmitted from man to man through the agency of flies. Although the conditions of life among the front-line troops exposed them to fly-borne infections with all the

intestinal protozoa, in some cases the infections were restricted to certain species only. This might have been due to temporary differences in the susceptibility of the human host. Thus in the autumn of 1942 the incidence of infection with *Iodamoeba* and *Giardia* was particularly high. Since normally adults are only slightly susceptible to *Giardia*, it is thought that lowered acidity of the stomach contents was responsible for the high incidence of this infection. Prophylactic treatment with Yatren (two pills twice weekly) and Rivanol (two pills every 2nd day) caused various alimentary disorders without reducing the incidence of intestinal protozoal infections.

C. A. Hoare

PICK, F. Beobachtungen an einer Kultur von *Entamoeba histolytica* (Schaudinn). [**Observations on a Culture of** *E. histolytica.*] *Antonie van Leeuwenhoek: J. Microbiol. & Serol.* 1941, v. 7, No. 1, 13–24. [20 refs.]

The author records various observations on *Entamoeba histolytica* in culture. Faced with the problem of restoring vitality to a strain, the growth of which in semi-solid horse serum+Ringer-egg medium was declining, he changed the medium for "Bacto Liver Infusion Agar". This, however, failed to improve growth, probably owing to the presence of some inhibiting factors. The amoebae were then cultivated in liver infusion-agar and horse serum-Ringer (1 cc. and 2 cc. respectively per tube), to which were added one loopful of rice starch, three drops of insulin (Organon brand) and two loopfuls of $CaCO_3$. The addition of insulin resulted in luxuriant growth and increased motility of the amoebae, which persisted in subsequent cultures. Since the insulin solution appeared to form with starch a mucilaginous-filamentar suspension, these two components were subsequently mixed and introduced into the medium simultaneously.

Another observation concerns vital staining of the amoebae: it was found that pyocyanin [amount not stated] imparts to them a bright greenish tint, reveals the nuclear structure and stimulates motility.

The author then deals with polarity in *E. histolytica.* Motile amoebae can frequently be seen carrying a clump of debris attached to one end of the body. This phenomenon was also observed when amoebae were placed in a drop of defibrinated sheep's blood and examined on a warm stage at 33°C. In such preparations the erythrocytes attach themselves to one end of the moving amoeba, where they form several layers arranged in a definite pattern, until their weight anchors the amoeba to one spot. This attachment does not occur with dead amoebae, while cysts become uniformly surrounded by red blood corpuscles lying in concentric layers.

Finally, the author describes the following phenomenon, which he interprets as precocious preparation for excystation through a definite point in the cyst. An amoeba will suddenly produce a pedunculate pseudopodium which does not retract but begins to perform boring movements, after which it travels around the body and gradually diminishes in size, until it reaches the starting point, where it merges with the body.

C. A. Hoare

COLONNELLO, F. L'ulcera gastro-duodenale nell'amebiasi intestinale cronica. [**Gastro-Duodenal Ulcers in Chronic Intestinal Amoebiasis.**] *Acta Med. Italica.* 1949, Sept., v. 4, No. 9, 229–32. English summary.

The English summary appended to the paper is as follows:—

"The author describes 16 cases of gastro-duodenal ulcer, in patients suffering with chronic-amoebic colitis, who were kept monthly under observation and treatment.

"The ulcers appeared years after the colic infestation, and therefore the author thinks that a correlation may exist between the chronic ulcero-amoebiasic colopatia and the gastro-duodenal ulcer.

"The antecedent gastro-duodenal lesions (frequent complications of chronic intestinal amoebiasis) suggest that the inflammatory factor played, in these cases, an important role in the insorgency [*sic*] of the gastro-duodenal ulcer.

"It may be argued, according to these statistic elements, that the chronic amoebiasis, when is not healed, may predispose the patients to a para-amoebiasic complication : the gastro-duodenal ulcer."

SMITH, S. L. H. & CLOW, J. M. **The Importance of Amebioma in the Differential Diagnosis of Abdominal Swellings.** *Chinese Med. J.* Shanghai. 1949, Apr., v. 67, No. 4, 193–5.

"Four cases of amebiomata and amebic abscess are reported, and the importance of this disease in the differential diagnosis of obscure abdominal swellings is discussed. The importance of sigmoidoscopy in these cases is stressed."

CHATTERJEE, P. K. & SEN GUPTA, S. **Multiple Amoebic Abscess of the Lungs.** *J. Indian Med. Ass.* 1949, Sept., v. 18, No. 12, 481–2.

A case with fatal termination in a Hindu.

NIU, Pao-ch'eng & LIU, Shih-hao. **Ascariasis of Liver complicating Amebic Abscess.** *Chinese Med. J.* Shanghai. 1949, June, v. 67, No. 6, 307–9.

"1) A brief history is given of a case of amebic liver abscess with secondary B. coli infection brought in by a migrating ascaris worm, the latter being aspirated during a liver puncture.

"2) The path of migration of the worm is discussed. The absence of significant jaundice leads to the assumption of a hepato-intestinal fistula.

"3) The symptoms of pain and spasm in the right hypochondrium after removal of the worm is explained by a possible subphrenic infection.

"4) The closing up of the abscess cavity was followed by serial X-ray films after injection of lipiodol."

EMMETT, J. **Refractory Amebic Abscess of the Liver treated with Chloroquine.** *J. Amer. Med. Ass.* 1949, Sept. 3, v. 141, No. 1, 22–4, 2 figs.

The author discusses previous cases of hepatic amoebiasis treated with chloroquine [this *Bulletin*, 1950, v. 47, 40] and reports a case of his own.

The patient, a man of 53, had been in another hospital for some five months with a draining amoebic abscess of the liver and a large sloughing necrotic ulcer involving the skin and subcutaneous tissue of the mid-epigastrium. The ulcer was 15×12 cm. and led to a draining sinus from the liver.

Emetine, penicillin, streptomycin and local irrigation had all been unsuccessful. The patient was anaemic and had lost 30 lb. in weight.

The discharge from the sinus showed active *E. histolytica* and trophozoites were demonstrated in stained sections from the wound. The complement fixation test for amoebiasis was positive.

The patient was given 0·5 gm. of chloroquine diphosphate (Aralen) on the day of admission and thereafter 0·5 gm. a day for ten days. On the fourth day of treatment, the sinus became negative for amoebae and remained so

(except for a single organism seen on the seventh day). Blood transfusions were given on the seventh and ninth days. A penicillin-resistant haemolytic staphylococcus was isolated from the wound and aureomycin was given on the eighth, ninth and tenth days. The drainage from the sinus ceased entirely on the tenth day ; up to then the staphylococcus had persisted. On the 12th day, the dosage of chloroquine was reduced to 0·25 gm. daily until the 21st day, when it was reduced to a weekly maintenance dose of 0·5 gm. The wound granulated and small pinch grafts were applied successfully on the 17th day. The patient was discharged on the 31st hospital day: convalescence was uneventful, he returned to work and has been free from symptoms for two months. Stool examinations were consistently negative for *E. histolytica* throughout.

The patient showed no intolerance to the drug, although the dosage was less than the usual dosage of 1 gm. daily followed by 0·5 gm. for two to three weeks.

H. J. O'D. Burke-Gaffney

CLERC, S. & BORGEIX, L. Nouvelles observations d'aspects chirurgicaux de l' amibiase intestinale. [**Observations on the Surgical Aspects of Intestinal Amoebiasis.**] *Bull. Méd. de l'Afrique Occidentale Française.* 1948, v. 5, No. 2, 337–42.

Brief notes on four cases of amoebiasis with unusual complications. In three cases there was a short history of fever with lumbar pain and the formation of a tender mass in the kidney region, accompanied by leucocytosis. The liver was enlarged in all three patients and was needled in one with negative results. In one patient, in whom the symptoms did not entirely subside after administration of emetine, the kidney was explored and a phlegmonous perinephric mass was found, but no pus ; this patient later passed dysenteric stools containing amoebae. No amoebae were ever found in the stools of the other two, but both cleared up completely under emetine treatment. In two the perinephritis was on the right side and the infection was probably due to a direct invasion from the liver, in the third it was on the left side and may have come from the splenic flexure. The fourth patient's symptoms were those of hepatitis and cholecystitis, until an acute attack of pain in the right iliac fossa suggested a perforation. Operation revealed thrombosis of the mesenteric vessels with infarction of a segment of gut two metres above the ileo-caecal angle. Later the patient passed dysenteric stools in which amoebae were found. Complete recovery followed large doses of emetine.

W. L. Harnett

MELEAGROS, J. M. **A Case of Epilepsy Secondary to Amoebiasis.** *Cyprus Med. J.* 1948, Apr., v. 1, No. 6, [In Greek, 27–8.]

The English summary appended to the paper is as follows :—

" A case of epilepsy secondary to amoebiasis is reported, which lasted six years. The application of the special antiamoebic treatment resulted in the complete cure of the disease.

" The probable pathogeny of the disease has been reported (allergy-neurotoxine) and the importance of the diagnosis in respect of prognosis is emphasized."

RELAPSING FEVER AND OTHER SPIROCHAETOSES

NÉEL, R., PAYET, M. & GONNET, C. La fièvre récurrente à tiques de Madagascar. Historique. Etat actuel de la question. [**Relapsing Fever in Madagascar ; History ; Present Position.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 7/8, 384–94. [25 refs.]

An interesting extract is given from the "Adventures of Robert Drury" who was a captive in Madagascar for 15 years from 1701 to 1717 and who made a second voyage there in 1719 to 1720. Drury mentions a long continued and severe illness, transmitted by a biting insect, and describes how, when a captive, he was ordered to sweep out with the utmost care, and remove all the furniture from a hut of the Vazimba tribe. His captors, of another tribe apparently, rarely ventured to stay in the huts of the Vazimba for fear of a biting insect, similar to the ticks found on cattle and only met with in the Vazimba country. This tick was known as "Poroponjy", and those bitten by it were ill for six to eight weeks, the ticks attaching themselves to the skin or even burrowing beneath it [jigger fleas ?]. One attack appeared to confer immunity (*sic*). This region was situated on the west coast of the island.

In the expedition of 1895 to Madagascar it is stated that out of a total of 18,000 men all were sick. The troops were living under bad conditions, in the centre of a district where relapsing fever is endemic, but it is impossible to say what proportion of illness was due to the latter disease. The first authentic case of relapsing fever, confirmed by blood examination, was recorded in 1911 in a child who had been sent to Tananarive for antirabic treatment. In 1912 and 1913 twenty-six further cases were reported at different points on the west coast of the island, and in 1930 a survey was made of the distribution of *Ornithodorus moubata*. Statistics gave 20, 19, 48, 13 and 12 cases of relapsing fever in the years 1941 to 1945, but the author considers that these figures are certainly much too low. Many cases are undoubtedly missed or wrongly diagnosed.

The onset is often acute, sometimes with rigors. In acute exacerbations the temperature may rise to above 40°C., accompanied by various degrees of prostration, severe headache and generalized pains, and constipation. Involvement of the liver and spleen occur, and these organs may be tender and enlarged. The number of attacks varies from one to seven and the prognosis is good, although certain forms may be severe and of long duration. Iritis is uncommon and not of a severe type. The variability of the symptoms makes examination of the blood essential, but the parasites may be difficult to find. *Ornithodorus moubata* was found over about an eighth of the area of the island, mainly on the west coast and corresponding to the distribution of relapsing fever. Animal experiments were carried out in too few cases to give conclusive results.

The Madagascar type appears to behave as other tick-borne forms of relapsing fever in its action on the nervous system ; treatment with penicillin appears to be ineffective, although it is true that, in two cases considered, this drug was only given late in the course of the disease—towards the 25th day of illness.

In conclusion the author considers that the infection behaves like that due to *Treponema duttoni*, but that it has not been proved that it is necessarily carried by *Ornithodorus moubata* in Madagascar. *C. F. Shelton*

LEPROSY

González Prendes, M. A. & Ybarra Pérez, R. Distribución geografica y epidemiologica de la lepra en Cuba. [**Distribution and Epidemiology of Leprosy in Cuba.**] *Rev. Sifilógrafía, Leprología y Dermatologia.* Marianao, Cuba. 1949, Mar. & Apr., v. 6, No. 1, 7–42, 6 maps. [53 refs.]

This was a paper read at the Fifth International Congress on Leprosy held in April, 1948. It goes in minute detail into the local geographical distribution of cases of leprosy in the island, according to districts, the character of the cases in the six districts into which Cuba is divided, namely Pinar del Rio, Habana, and Matanzas in the west ; Las Villas and Camagüey in the centre, and Oriente in the east. For each of these districts we are told the area in square kilometres, the population and its density, the rivers, the temperature, maximum, minimum and average, the monthly rainfall, the humidity, etc.

In all Cuba there are 2,840 leprosy patients, 2,198 ambulatory and 642 hospitalized or in institutions. As regards the different districts : in Pinar del Rio there are 64 ambulatory patients and 19 in hospital ; of the 15 municipal departments three have no such patients ; there are 1·74 patients per 10,000 " healthy inhabitants ". Of the 64 ambulatory, 40 are of the lepromatous type, 14 tuberculoid, eight non-specific, and two not classified. In Habana, there are 508 ambulatory and 161 hospitalized, or 669 in all : 295 of the ambulatory are of the lepromatous type, 89 tuberculoid, 87 non-specific and 47 not classified [these total 518, not 508] ; 340 live in the capital and the ratio is 4·11 per 10,000 healthy inhabitants. Matanzas has 170 leprosy patients, or 3·85 per 10,000 ; 139 are ambulatory and 31 in leprosaria ; of the former 89 are lepromatous, 17 tuberculoid, 14 non-specific and 19 unclassified.

In the Central Region there are 666 ambulatory and 148 in hospitals, 814 in all ; 326 of the former are lepromatous, 82 tuberculoid, 126 non-specific and 132 not classified. In the Las Villas district, in the western half of the Central Region, there are 471 leprosy patients, 4·07 per 10,000, 383 ambulatory and 88 in institutions. The ambulatory comprise 199 lepromatous, 53 tuberculoid, 69 non-specific and 62 not classified. Camagüey, the eastern half of the Region, has 283 ambulatory cases and 60 in hospitals, 343 in all, 5·80 per 10,000 ; 128 of the 283 are of the lepromatous type, 29 tuberculoid, 57 non-specific and 69 not classified. The capital itself has most in its municipality, 145 ; two others have 30 or more.

Lastly, Oriente ; this is the district most highly infected in all Cuba, with 1,104 patients (6·05 per 10,000), of whom 821 are ambulatory and 283 in leprosaria ; of the former 354 are of the lepromatous type, 108 tuberculoid, 188 non-specific and 171 not classified.

Line maps are reproduced of each region. Other information is detailed but of rather doubtful value based on so few cases. Thus, for each of the 6 districts are given the numbers of either sex affected, the nationality, whether Cuban or foreign, whether white, coloured or negroes, whether married, single, widowed or divorced, also the prevalence by age and occupation, but all stated in percentages only not in actual figures, even in Pinar del Rio, for example, with the small total of 83, ambulatory and hospitalized together.

H. Harold Scott

Casile, M. L'organisation générale du Service National de la Lèpre au Brésil. [**The Organization of the National Leprosy Service in Brazil**] *Méd. Trop.* Marseilles. 1949, July–Aug., v. 9, No. 4, 536–60.

A general review.

DE SOUZA-ARAUJO, H. C. As sulfonas não alteram a ácidoálcool resistência dos bacilos de Hansen e de Stefanski. [**Absence of Alterations by Sulphones of the Acid-Alcohol Fastness of Hansen's and Stéfansky's Bacilli.**] *Mem. Inst. Oswaldo Cruz.* 1948 Sept., v. 46, No. 3, 579–80.

Promin, diasone and Rongalita did not alter the acid-alcohol fastness of the organisms of human and of rat leprosy. *H. J. O'D. Burke-Gaffney*

VALE, Sérgio. **Subsidiary Studies to Leprosy of the Eyes.**

This book is reviewed on p. 175.

HAMERS A. L. T. M. & HERMANS E. H. Lepratherapie met sulfonamides. [**Treatment of Leprosy with Sulphonamides.**] *Nederl. Tijdschr. v. Geneesk.* 1949, July 9, v. 93 (iii), No. 28, 2345–50. English summary.

A series of 35 patients suffering from leprosy were treated with diasone and promin. There were 12 with tuberculoid lesions and 23 with lepromatous or atypical disease.

Of those with tuberculoid disease, in 7 the disease was arrested, in 4 there was some improvement and in only one did the disease appear to be aggravated. In view of the naturally benign course of this form of the disease, there must be some doubt whether even a slight risk of aggravation should be taken. It did, however, appear that in most of these cases arrest and healing were accelerated.

The results in the lepromatous cases were less satisfactory. Of the 23 patients only 17 were under treatment for 8 months or more and of these there was improvement in 13, one remained stationary and 3 got worse on account of leprotic reactions. There was a high incidence of anaemia and severe depression and 4 of the original 35 had to discontinue the drug because of intolerance. It is concluded that, because of the bad prognosis of these cases, it is justifiable to give sulphones, but the patients must be closely watched for leprotic reactions. Treatment of these last was unsatisfactory. Iron and liver treatment is necessary according to the type of anaemia.

A. L. Winner

GRAMBERG, K. P. C. A. Leprabestrijding in Indonesië straks. [**The Prevention of Leprosy in Indonesia in the Future.**] *Med. Maandblad.* Batavia. 1949, July 1, v. 2, No. 7, 211–18.

The whole of the Leprosy prevention service in Indonesia was destroyed by the Japanese in 1942 and the author considers that in rebuilding it a different and better organization should be evolved. He points out that before 1942 the leprosy prevention service was entirely separate from the leprosaria, that the latter were all independent of the service and of each other, and that the majority were not under medical direction. Prevention and treatment were not co-ordinated. He also suggests that in the present state of our knowledge a *leprosy prevention* service is not practicable ; it is not certain that the leprosy bacillus is the sole infecting agent, nor is there any unanimity as to the route of infection. Moreover the degree of civilization in Indonesia is not such as to ensure the willing and intelligent co-operation of the whole populace in the enforcement of stringent sanitary regulations. The best that can be hoped for is a *leprosy tracing service* and this must clearly be closely linked with a *leprosy treatment service.*

For various reasons it will be necessary to treat many patients away from their homes and the emphasis should be on ascertainment and treatment centres, leprosaria being only a part, though an essential part of the whole scheme. The leprosaria are no answer either to treatment or to prevention and should not be organized as prisons nor as the pet projects of either philanthropic organizations or officials.

The author proposes the setting up of two or more ascertainment centres, linked with outlying clinics; here patients could stay for 3–6 months while their cases were being assessed and disposal decided. These units should be closely associated with hospital centres having all the resources of modern medicine. For cases not requiring these there should be sanatoria, without too great restrictions and catering for all classes and types of leprosy. These must be under medical direction. Finally, for the hopeless cases there should be leprosaria, linked both with a sanatorium and an ascertainment centre. These too should not be prisons.

For the administration of all this a new organization is suggested to be known as the "Double Cross" organization. This will have a central administration which will be directly responsible for the ascertainment centres and clinics. The sanatoria and leprosaria should continue under voluntary auspices, but must be inspected by the central administration and the general lines of policy must be laid down for them. Thus co-ordination will be ensured without loss of the essential quality of the work of these voluntary bodies devoted to the care of leprosy patients. If the conditions are fulfilled, the "Double Cross" organization will assist the voluntary organizations financially. [The proposed new name does not sound very happy to Anglo-Saxon ears.]

A. L. Winner

HELMINTHIASIS

HUHTALA, A. Vergleichende pharmakologische und chemische Untersuchungen über Farnextrakte. [**Comparative Pharmacological and Clinical Studies of Extracts of Male Fern.**] *Ann. Med. Exper. et Biol. Fenniae.* 1948, v. 26, Suppl. 5, 299 pp., 16 diagrams. [Numerous refs.]

BUEDING, E. **Metabolism of Parasitic Helminths.** *Physiol. Rev.* 1949, July, v. 29, No. 3, 195–218. [240 refs.]

A full review of the literature with 240 references.

DECOURT, P., DUPOUX, R. & PELLOUX, A. Sur la toxicité des parasiticides et des molluscocides pour les vertébrés et les coefficients de sécurité nécessaires à leur emploi. (Première note). [**The Toxicity for Vertebrates of Parasiticidal and Molluscicidal Substances and the Coefficients of Safety for their Use.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 1/2, 33–7.

The authors recommend that studies on the toxicity to man and higher animals of parasiticidal and molluscicidal substances should be put on an exact basis and with this end in view they outline various factors and circumstances which must be considered in approaching the subject. In this preliminary note the question of absorption of such substances by the oral route is discussed. A "unit of toxicity" is defined, which is based on the risks incurred in drinking water or taking foodstuffs which have been treated for the destruction of parasites or parasite vectors. Linked with this is the definition of a "coefficient of safety" which is expressed in a mathematica

formula whereby a margin of safety can be calculated for the concentrations to be used in the practical application of toxic substances, and for comparing the toxicity to man and higher animals of different kinds of substances and the risks involved in different methods of application. *J. J. C. Buckley*

AZAR, J. E., PIPKIN, A. C. & GARABEDIAN, G. A. **An Intensive Treatment Regimen of Vesical Schistosomiasis with Fuadin.** *Amer. J. Trop. Med.* 1949, July, v. 29, No. 4, 595–604. [11 refs.]

Fifty-five North Syrian males, 17 of them adults of 20 to 40 years of age and the rest aged from 9 to 14 years, were treated as ambulant out-patients for proven *Schistosoma haematobium* infestation. The drug used was "Repodral-Winthrop", which is said to be identical with Stibophen (or Fouadin—a 6·3 per cent. solution of sodium antimony 111 bis-catechol-2,4 disulphonate). The adult dosage was 2 ml. intramuscularly in the early morning, followed at intervals of 3 hours by two more injections of 4 ml. on the first day; on each of the two following days three injections of 4 ml. were given at intervals of 3 hours; the total was thus 34 ml. of the 6·3 per cent. solution given over three days. The children were given 1 ml. and then 2 ml. in a similar manner, the total being 17 ml. in three days. The injections, which were intragluteal, in some of the children caused such soreness that walking was difficult, but apart from this the side-effects of the treatment were slight. Five children developed slight bradycardia; one adult suffered a paroxysmal cough after the 5th dose; 2 children and 5 adults had slight muscular pains in the extremities on the second day, and 4 children and 5 adults complained of bilateral frontal headache. In 12 children and 5 adults there was a brisk haematuria during treatment, and in 2 of the children this continued for 16 days; in most patients, though there was a transient increase in the amount of blood in the urine, haematuria had ceased by the third day after treatment.

Re-examination during the 5 days immediately after treatment and for another 5-day period two weeks later showed a progressive reduction in the number of patients passing viable ova in the urine; 16 days after treatment between 60 and 70 per cent. of them (including all the adults) had ceased to pass viable eggs, and half the patients were passing no eggs at all. Further follow-up studies were impracticable, and in any event they would probably have been vitiated by reinfestation.

While making no undue claims the authors consider that this three-day course of treatment with Stibophen possesses advantages which are not offset by the development of serious toxic complications. *A. R. D. Adams*

OLIVIER, L. & MAO, C. P. **The Early Larval Stages of *Schistosoma mansoni* Sambon, 1907 in the Snail Host, *Australorbis glabratus* (Say, 1818).** *J. Parasitology.* 1949, June, v. 35, No. 3, 267–75, 20 figs. on pl.

"A study was made of the early developmental stages of *Schistosoma mansoni* in the snail host, *Australorbis glabratus*. The mother sporocyst of *S. mansoni* is an elongate, thin-walled sac which lies, tightly convoluted, usually near the external surface in the head-foot region of the snail. From 200 to 400 daughter sporocysts are produced within each mother sporocyst by multiplication of the cells of the germinal line carried by the miracidium. Each miracidium carries 50 to 100 germinal cells and these divide to produce 200 to 400 germinal cells. Each of these germinal cells then gives rise to a daughter

sporocyst embryo. No germinal masses were found in mother sporocysts. The daughter sporocysts leave the mother sporocyst and migrate to the digestive gland or, occasionally, to other organs of the snail. At the time of migration the daughter sporocyst is a small elongate sac containing 50 to 100 germinal cells in the lumen. After reaching the definitive location the daughter sporocysts elongate and enlarge and ultimately give rise to numerous cercarial embryos. Most of the cercarial embryos arise from separate germinal cells which result from division of the germinal cells carried by the migrating daughter sporocysts. However, some of the germinal cells give rise to germinal masses which in turn produce cercarial embryos by a special form of polyembryony. The cercariae leave the sporocysts through a terminal birth pore. The early developmental stages of *Schistosoma mansoni* are compared with those previously described for *Trichobilharzia stagnicolae* and *Schistosomatium douthitti*. In all essential characteristics the early development of these three species is closely similar."

YOLLES, T. K., MOORE, D. V. & MELENEY, H. E. **Post-Cercarial Development of *Schistosoma mansoni* in the Rabbit and Hamster after Intraperitoneal and Percutaneous Infection.** *J. Parasitology*. 1949, June, v. 35, No. 3, 276–94, 2 figs.

"1. The routes of migration and the stages of development of *Schistosoma mansoni* in various tissues and portions of the circulation of the rabbit and hamster following intraperitoneal and percutaneous infection are described.

"2. It was found that in rabbits infected intraperitoneally a very small proportion of the worms were able to reach the lungs and portal circulation leading to the conclusion that there was a high mortality in the peritoneal cavity or in the adjacent tissues. This was in contrast to the finding that in rabbits following percutaneous infection, and in hamsters following either intraperitoneal or percutaneous infection a considerable proportion of the worms reached the lungs and portal circulation.

"3. Schistosomulae were recovered from the skin or adjacent subcutaneous tissues of hamsters on the fourth day after percutaneous infection, and from the ears of rabbits as late as the ninth day.

"4. The development of worms which reached the lungs and portal circulation in rabbits infected intraperitoneally was slower than in rabbits infected percutaneously suggesting that some of the "intraperitoneal worms" had suffered damage which was not apparent in worms following percutaneous infection.

"5. The development of worms to maturity in rabbits infected percutaneously was slower than in hamsters similarly infected, indicating that the rabbit is a less favorable host than the hamster for *S. mansoni*."

SCHREIBER, Freda G. & SCHUBERT, M. **Toxicity of some Chemical Compounds to Cercariae of *Schistosoma mansoni*.** *J. Parasitology*. 1949, Aug., v. 35, No. 4, 364–6.

"The toxicity to cercariae of *Schistosoma mansoni* of a number of organic chemical compounds at concentrations of ·05 to ·005 per cent. is estimated. The most toxic compounds belong mainly to two classes, quinones and tertiary amines."

AUGUSTINE, D. L. & WELLER, T. H. **Experimental Studies on the Specificity of Skin Tests for the Diagnosis of Schistosomiasis.** *J. Parasitology.* 1949, Oct., v. 35, No. 5, 461–6. [11 refs.]

"Rabbits were repeatedly exposed to three species of non-human schistosome cercariae, *C. stagnicolae*, *C. physellae* and *C. elvae*, with the production, after the first exposure, of an extensive dermatitis. Approximately seven weeks after the last exposure, intradermal tests were performed on the 5 experimental and 2 control rabbits, using antigens made from the 3 non-human schistosome cercariae, two different antigens prepared from cercariae of *Schistosoma mansoni*, and an antigen made from cercariae of a strigeid, *D. flexicaudum*. Essentially negative reactions were obtained with the two *Schistosoma mansoni* antigens when employed in high dilutions. The results obtained with the other antigens were equivocal.

"An effective method for the concentration of living dermatitis-producing schistosome cercariae was developed by utilizing the positive phototropic and negative geotropic reactions of the cercariae."

DIAS, Caio Benjamin. **Quimioterapia Antimonial na Esquistossomose Mansônica.** This book is reviewed on p. 176.

NOLAN, M. O. & BERRY, E. G. **Preliminary Field Trials with Laboratory-Tested Molluscacides.** *Pub. Health Rep.* Wash. 1949, July 29, v. 64, No. 30, 942–9.

"In preliminary field trials, the following 10 organic compounds were tested as potential molluscacides: *N*-cyclohexyl-2,3,4,6-tetrachlorophenoxyacetamide; benzenethiol ester of acetic acid; 1-bromo-2,4-dinitrobenzene; 1-dodecylguanidine acetate; 2,3-dichloro-1,4-naphthoquinone; 2-methyl-1, 4-naphthoquinone; pentabromophenol; pentachlorophenol, Na salt, monohydrate ("Dowicide G"); 2,3,4,6-tetrachlorophenol ("Dowicide No. 6"), and *S*-(β-[*p-tert.*-octylphenoxy-β-ethoxy]ethyl)-thiopseudourea, HCl, hemihydrate.

"The compounds were applied in the form of an emulsion or acetone solution in concentrations of 10 parts per million to ponds, borrow pits, shallow marshes, or roadside ditches, where the predominant snail was *Tropicorbis obstructus donbilli*. . . .

"Pentabromophenol and pentachlorophenol were the only compounds that showed promising molluscacidal activity. Both compounds are caustic and irritating to the mucous membrane of the respiratory tract in humans."

HILL, J. H. **Asymptomatic *Schistosoma japonicum* Infection associated with Rectal Carcinoma. Report of a Case.** *Amer. J. Clin. Path.* 1949, Oct., v. 19, No. 10, 985–9, 2 figs. [20 refs.]

"An asymptomatic infection with *Schistosoma japonicum* was found in a veteran of the Pacific Theater in World War II who also had carcinoma of the rectum.

"From the literature it appears that rectal carcinoma is a very infrequent complication of schistosomiasis, although additional cases must be studied to establish a causal relationship. Schistosomiasis, when asymptomatic, may be easily overlooked."

Koo, Shu-ngoeh & Woo, Dje-li. **Pleural Paragonimiasis complicated by Empyema Thoracis. Report of a Case.** *Chinese Med. J.* Shanghai. 1949, Apr., v. 67, No. 4, 211–13, 1 fig. on pl.

"A case of empyema thoracis is reported with the finding of *Paragonimus* eggs in the sputum and also in the excised pleura. The etiology of empyema in this patient is discussed."

Feng, L. C., Lin, C., Ting, H. C. & Hwang, J. C. **The Action of Areca Nut (*Areca catechu*) and its Extracts on Tapeworms.** Reprinted from *Peking Natural History Bull.* 1949, v. 17, No. 4, 233–40. [12 refs.]

Experiments were carried out *in vitro* with an extract of Areca nut and the human tapeworms, *Taenia solium*, *T. saginata* and *Hymenolepis nana*; and *in vivo* with an Areca bismuth iodide compound and the cat tapeworms, *Dipylidium caninum* and *Taenia taeniaeformis*.

The preparation of the extract for *in vitro* tests is described in detail and its effect, in 1 to 2 per cent. solution in saline, on 8 specimens of *T. solium*, freshly obtained from human cases, is summarized in a table. The reactions of scolices, immature segments and mature segments when immersed in the solution, were observed. It was noticed that the scolex, which frequently becomes attached to the body of the worm, loosens its hold in about 3 minutes and becomes entirely motionless in about 5 minutes. The immature segments, *i.e.*, about the anterior 2 feet of the strobila are paralysed within 5 minutes and all motion ceases completely. Another kind of reaction was an increase in body-length, in one instance from 5 feet to 6 feet, after immersion for 6 minutes in the extract. Similar tests with two specimens of *T. saginata* showed that this species seems to be less sensitive than *T. solium* to the action of the extract. *Hymenolepis nana*, however, was very susceptible and almost immediately became flaccid in a 2 per cent. solution of the extract and then the scolex stopped moving and the worm straightened out. Comparative tests *in vitro* with *Filix mas* extract (1 per cent. solution in saline containing 1 per cent. sodium bicarbonate) and *T. solium* and *T. saginata* resulted in immediate shrinkage and rigidity of the worms.

For *in vivo* tests a bismuth iodide compound of the alkaloid was prepared. The method is described in detail. Toxicity tests were carried out by oral administration to rats, after which a cat, naturally infected with *Taenia taeniaeformis* and *Dipylidium caninum*, was given orally 150 mgm. of the compound. Forty minutes later tapeworms emerged from the anus but were not completely evacuated until after a second treatment with 350 mgm. was given, when 10 *T. taeniaeformis*, and 77 *D. caninum* were evacuated, all with the heads still attached.

In discussing these results the authors conclude that the paralysing effects of the extract indicate that it effects primarily the nervous system of the worms. This is supported by the fact that the scolex and immature segments are more quickly paralysed than the gravid segments, in which the nerves are somewhat degenerate. *Filix mas*, on the other hand, appears to effect the muscles primarily. The value of the paralysing action of Areca nut on the scolex is emphasized. *J. J. C. Buckley*

Marangos, G. **Hydatid Disease of the Liver and Lung and its Surgical Treatment.** *Cyprus Med. J.* 1948, June, v. 1, No. 8, 3–15, 16 figs. [Greek summary 16–19.]

GALLIARD, H. Les souches hyperinfestantes de *Strongyloïdes stercoralis*. **Hyperinfective Strains of** *Strongyloidis stercoralis*. *C.R. Soc. Biol.* 1949, May, v. 144, Nos. 9/10, 686–8.

Galliard discusses the question of hyperinfection in *S. stercoralis* with special reference to the possible existence of strains of this parasite having fixed characters in regard to virulence, resistance to treatment, and auto-infectivity. He reviews the evidence and opinions of other workers and cites his own experiences with human infections and experimental transmission of these to laboratory animals. In his opinion hyperinfectivity and virulence are not necessarily characteristics of particular strains but that they result from deep-seated changes in the biology of the parasite which are in turn accountable to the variability of the environment. Thus, fatal cases of strongyloidiasis are always associated with persons who are in very poor physical condition, in other words, in the human host, the parasite only becomes hypervirulent when a suitable environment is available. *J. J. C. Buckley*

SPRENT, J. F. A. **On the Toxic and Allergic Manifestations produced by the Tissues and Fluids of Ascaris. I. Effect of Different Tissues.** *J. Infect. Dis.* 1949, May–June, v. 84, No. 3, 221–9, 4 figs. [37 refs.]

"Whole worms and isolated ascaris tissues were frozen, lyophilized and stored in vacuo. Repeated intraperitoneal or single intravenous injections of these materials failed to produce toxic symptoms in rabbits, guinea pigs and mice. The body fluid caused no symptoms when given orally to guinea pigs. Repeated injections led to degenerative changes in the hepatic cells, increased periportal cellular infiltration, and cellular infiltration of the aveolar septa. These substances were shown to cause active anaphylactic sensitization of the guinea pig to the same antigen, skin sensitivity and precipitins in rabbits and a skin reaction in a person sensitized to ascaris, although the serum of this person showed no evidence of precipitins against any of the antigens. In mice the tissues and body fluid caused the production of precipitins but no sensitivity as tested by active anaphylaxis and skin tests. Rabbit antiserums against ascaris ovary, cuticle, muscle, body fluid and intestine caused passive anaphylactic sensitization in the guinea pig against the homologous antigen."

See also p. 135, NIU & LIU, **Ascariasis of Liver complicating Amebic Abscess.**

HUANG, A. C. C. & WANG, An-tin. **Biliary Ascariasis. A Report of 4 Cases.** *Chinese Med. J.* Shanghai. 1949, June, v. 67, No. 6, 310–12.

"1. Four cases of biliary ascariasis are reported.

"2. Biliary ascariasis is not a very rare disease in Szechwan province. It accounts for 13·3 per cent of all the patients with biliary tract diseases who came to operation in a period of 20 months in the Chungking Central Hospital.

"3. The diagnostic points of biliary ascariasis are discussed."

ALLEN, R. W. & JONES, L. D. **The Incidence of Ascarids (*Ascaris lumbricoides*) in Midwestern Swine.** *Proc. Helminthological Soc. of Washington.* 1949, July, v. 16, No. 2, 108–12. [21 refs.]

"1. During the course of anthelminthic tests conducted at Chicago, 505 pigs were examined for *Ascaris lumbricoides* by fecal examination involving mainly the direct smear method.

"2. The results, obtained in 1945 and 1947, showed that 35 percent of the pigs were passing *Ascaris* eggs in the feces."

BLOSS, J. F. E. **Filaria in the Sudan.** [Correspondence.] *Trans. Roy. Soc. Trop. Med. & Hyg.* 1949, Sept., v. 43, No. 2, 236–8.

In a letter the writer questions several statements and conclusions of WOODMAN [this *Bulletin*, 1949, v. 46, 956]. In his experience, *Chrysops* spp. do frequently attack man and are found in the vicinity of human habitations. (Woodman stated "It is possibly not the optimum, or even the commonest, vector.") He does not consider the map showing the distribution of *Onchocerca* correct, as Woodman has included 10,000 miles of uninhabited game preserve. "Onchocerciasis also exists along the Ethiopian border from the map reference 'Pibor' northwards to opposite the map reference 'Melut.'" Dr. Bloss has found 30 per cent. infection rate in this area.

He complains that in selecting cases for examination for onchocerciasis, the author includes some "eye cases," none of which "had any clinical examination to prove this diagnosis, and it is impossible to make such a diagnosis without such an examination." He therefore questions whether the cases of blindness and other eye conditions can be attributed to onchocerciasis and in particular claims that the author's table on p. 548 is a little misleading. [In fairness to the author, it must be pointed out that he stated that "some at least were blind from causes other than *O. volvulus*" and that in his table the column heading was "Blindness percentage." He made the point he wished to make, namely that blindness, including blindness from onchocerciasis, was relatively low in the Sudan area where he carried out his survey.]

Bloss states that "onchocerciasis as a cause of large hydroceles has been proved in the Belgian Congo. *Loa loa* is a connective tissue parasite and it would not be unusual to find it in the large hydroceles, but that would not prove that it caused the hydroceles."

His letter concludes with the remark that onchocerciasis is a serious problem in this particular part of the Sudan and that he hopes that the details of the survey carried out by Dr. R. Kirk and Mr. D. J. Lewis will soon be published.

L. E. Napier

GALLIARD, H., MILLE, R. & ROBINSON, W. A. Recherches sur la filariose à Tahiti. (Note préliminaire.) [**Studies on Filariasis at Tahiti.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 5/6, 174–8.

A filarial survey of the total population (916) of the district Paea in Tahiti, excluding children aged 1 to 5 years, showed a microfilarial index of 30·3 per cent. and clinical filariasis in 20 per cent. (lymphangitis, 18·8 per cent. and elephantiasis, 9 per cent.). Examinations of blood in schools of other districts gave the following results: Faaa, 21·48 per cent.; Punauia, 12·68 per cent.; Papara, 16 per cent.; Mataea, 15·79 per cent. In the Society Islands, the index varies from 20 to 60 per cent.

The infection rate is higher in populations of the hilly parts than in those inhabiting the coast, which is in accordance with the habits of the vector, *Aëdes scutellaris pseudoscutellaris*.

In Paea district, it was found that at least one person was infected in 191 houses out of 234, or 82 per cent. Other data recorded from Paea are as follows:—57 per cent. of those infected are males. The microfilarial index attains its peak between the ages of 21 and 30 years, but often very old people show the highest intensity of microfilariae in the blood. Lymphangitis first

appears at the age of 6 years and attains a maximum at 25 years ; elephantiasis begins at 15 years but in most cases at 40 years and reaches a peak at 48 years. The relationship between the duration of elephantiasis and the microfilarial index is as follows :—elephantiasis for 1 to 10 years (53 cases), microfilariae present in 30 per cent. ; 11 to 20 years (17 cases), 41 per cent. ; 21 to 52 years (13 cases), 15 per cent. Forty-six per cent. of people with lymphangitis but without elephantiasis are positive for microfilariae ; 32 per cent. of people with both lymphangitis and elephantiasis, are positive. Elephantiasis without lymphangitis is never accompanied by microfilariae in the blood. Lymphangitis thus appears to be an indication of recent reinfection.

Five species of mosquitoes were found, of which three are common, *Aëdes scutellaris pseudoscutellaris*, *Aëdes aegypti* and *Culex fatigans* ; and two are rare, *Culex annulirostris* and *C. sitiens*. *Aëdes scutellaris pseudoscutellaris* is the principal vector but *C. fatigans* is also important on account of its domestic habits. Mosquitoes have a very high natural infection rate (50 per cent.) in the endemic areas.

The hyperendemicity of filariasis in the South Pacific Islands is much more marked than in Fiji, for example, and is due to the mode of life of the people, the geographical conditions, the high infectivity of the insect vectors and their abundance. *J. J. C. Buckley*

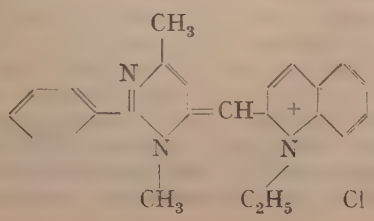
MONTEIRO, E. S. **Identification of Microfilaria.** [Correspondence.] *Brit. Med. J.* 1949, Nov. 12, 1115.

The writer of this letter has had rapid and efficient results in identifying species of microfilariae in the field by the following method of vital staining :

A drop of saturated alcoholic solution of brilliant cresyl blue is placed on a slide and allowed to dry. A drop of the suspected blood is placed on the prepared slide and covered with a coverslip, which is sealed off at the edges with vaseline. The microfilariae survive for about five minutes and the granules are distinctly stained, so that if the slide is examined immediately identification is easy. *H. J. O'D. Burke-Gaffney*

PETERS, L., WELCH, A. D. & HIGASHI, A. **The Antifilarial Action of Cyanine Dyes. II. Selection of 1′-Ethyl-3, 6-Dimethyl-2-Phenyl-4-Pyrimido-2′-Cyanine Chloride (#863) for further Study as a Potential Antifilarial Agent.** *J. Pharm. & Exper. Therap.* 1949, Aug., v. 96, No. 4, Pt. 1, 460–71. [11 refs.]

In the course of researches on filaricidal drugs, the effect of a number of cyanine dyes against natural infections of *Litomosoides carinii* in the cotton rat and their activity against the parasite *in vitro* was studied [this *Bulletin*, 1949, v. 46, 763]. The substance named in the title (#863) was selected from a number of active substances for further trial and has the following constitution :—



Intraperitoneal administration was found to effect more cures than dosage by mouth. Although cures were produced when the drugs were given subcutaneously or intramuscularly, damage produced in tissues at the site of inoculation was such as to prevent them being given in this way to human patients. Intravenous administration also gave rise to some cures but the cyanines as a class caused circulatory depression, and some deaths resulted in experimental animals. It appeared that the maintenance of a constant level of drug in the blood was not required for successful treatment and the total dosage given was of more importance than the size of individual doses. Counts of the microfilariae in the blood of cotton rats treated with #863 and in untreated controls made over a period of six months showed that the drug caused a slow decline in numbers, and the authors concluded that it exerted some effect on the parasites. At autopsy only dead adult worms were present in contrast to active forms in the controls. In dogs, on the other hand, infected with *Dirofilaria immitis*, treatment with cyanines caused a rapid fall in the number of microfilariae whereas adult worms were but little affected. It has now been found that #863 is ineffective against *W. bancrofti* in man and a report on the clinical trials will appear in due course. *J. D. Fulton*

MAZZOTTI, L. Observaciones de pacientes oncocercosos radicados fuera de las regiones endémicas. [**Observations on Patients with Onchocerciasis, who originated in Endemic Zones.**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1949, June, v. 10, No. 2, 179–82.

The English summary appended to the paper is as follows:—

"Twenty eight patients, arrived from the endemic zones of onchocerciasis, have been studied during different lapses of time, and only one of them showed an onchocercal nodule, two years after his coming to Mexico City. The evolution of the parasite in the definitive host is discussed."

BRUMPT, L. C. & CHABAUD, A. G. Le phototropisme positif des microfilaires d'onchocerques. [**Positive Phototropism of Onchocercal Microfilariae.**] *C. R. Soc. Biol.* 1949, May, v. 144, Nos. 9/10, 646–8.

The localization of the microfilariae of *Onchocerca* in the eyes may be accounted for in three different ways. Firstly, the proximity to the eyes of the nodules which contain the parent worms. This is supported by the frequency of eye lesions in American onchocerciasis which is characterized also by the occurrence of nodules mainly on the head. Secondly, on the assumption that the microfilariae have a predilection to invade the tissues of the eye. Thirdly, that the microfilariae possess a positive phototropism. In support of the latter theory the history of a white man, aged 45, who contracted onchocerciasis in the Cameroons, is cited. In addition to 26 nodules, he showed a typical onchocercal skin lesion, and skin biopsy on the lesions revealed a marked predominance of microfilariae as compared with biopsy on healthy skin. It was remarked that the lesions were situated on parts of limbs which are normally exposed to light. On the left arm, the upper limit of the lesion corresponded with the lower edge of the shirt sleeve. On the lower limbs, the lesions were situated on parts of the legs which were normally exposed. Elsewhere the skin was healthy; the eyes and scrotum were also normal.

It is maintained that the existence of microfilarial phototropism would seem to explain the situation of *Onchocerca* lesions, whether ocular, in the skin or in the scrotum. Thus, in the eye, the microfilariae are found in the most anterior part of the organ. It is also suggested that as ocular onchocerciasis

does not occur in white-skinned persons [a misleading statement, as it has been recorded in Europeans in Kenya] the microfilariae in such persons are not attracted so much by the transparency of the conjunctiva as they would be in black-skinned people.

In addition to the case cited above, in relation to the localization of skin lesions in exposed parts of the body, reference is made to the occurrence of onchocercal skin lesions in Central American Indians, predominantly in the ears, eyelids and lips, in other words where the skin is thin or less pigmented. Similarly, in elephantiasis of the scrotum, it is thought probable that in Africans the skin of this organ, especially if distended, would be more transparent than in other parts of the body. *J. J. C. Buckley*

MARTÍNEZ BÁEZ, M. Desintegración de las microfilarias de *Onchocerca volvulus* en la piel de los pacientes oncocercosos tratados con Hetrazán. [**Disintegration of Microfilariae of** *O. volvulus* **in the Skin of Patients treated with Hetrazan.**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1949, June, v. 10, No. 2, 95–9, 2 figs.

The English summary appended to the paper is as follows :—

" In several cases of onchocerciasis, with normal microfilariae of *Onchocerca volvulus* in the skin, as showed by biopsies performed before any treatment, dead and disintegrating microfilariae were found in samples of the skin of such cases, after a treatment with 0·006 gm. of Hetrazan daily during a week. Such dead microfilariae were in the center of foci of necrosis and cellular infiltration. The death of such microfilariae " in situ " is considered to be due to Hetrazan."

VARGAS, L. Notas sobre la oncocerciasis. VIII. Lineamientos entomologicos sobre el control de los simúlidos. [**Notes on Onchocerciasis. Entomological Aspects of Control of** *Simulium.*] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1948, Dec., v. 9, No. 4, 313–20. English summary (6 lines).

The English summary appended to the paper is as follows :—

" The author considers that Onchocerciasis is susceptible of control if fight is directed in first term against *S. ochraceum* and then against *S. callidum* and *S. metallicum.* Recommends control from October to April, during the dry season, using methods directed against the adults or larvae ; the author details the characters of the breeding streams, the results that may be expected and the way of using the larvicides."

APARICIO GARRIDO, J. Contribución al estudio de la epidemiologia y la clinica de la oxiuriasis. [**Epidemiological and Clinical Aspects of Infestation by** *Enterobius vermicularis.*] *Med. Colonial.* Madrid. 1949, Oct. 1, v. 14, No. 4, 334–49, 6 figs.

Infestation by *Enterobius vermicularis* is not, as many believe, more or less limited to childhood. The author gives a table of 50 patients whose ages varied from one year to 73 years and states the commonest symptoms present. Pruritus ani was the chief complaint in all ; but diarrhoea, tenesmus, cough, eczema, urticaria, insomnia and general irritability were far from infrequent. The most efficacious treatment, in the author's experience, was by gentian violet, 0·06 gm. three times daily in the food, for a week ; this was repeated twice with a week's interval, that is, treatment in the 1st, 3rd and 5th weeks, 2nd

and 4th weeks rest. Two relapsed in spite of repeated courses, 4 others relapsed but were cured by repetition of the course, 25 were cured by the first course (*i.e.* of five weeks); unfortunately the result in 19 was not known. The only prohibition is the taking of alcohol during the treatment.

The author notes that enterobiasis is a family infestation and that it is necessary to treat not only those with symptoms, but any member of the family who harbours the worm whether presenting subjective symptoms or not.

H. Harold Scott

DENHOFF, E. & LAUFER, M. W. **Pinworm Infection and Childhood Behavior.** *Amer. J. Dis. Children.* 1949, June, v. 77, No. 6, 746–52.

Symptoms of a large variety are attributed to pin-worm (threadworm: *Enterobius vermicularis*) infection. The authors have attempted to ascertain if there is justification for the association of this infection with many of these symptoms. Forty children, including twelve controls, aged four to twelve years, under treatment in a children's psychiatric hospital, were the subjects of investigation.

Observations were made before and after effective treatment (gentian violet, 10 mgm. per year of age, divided into three doses, given daily for ten days).

The symptoms considered were:—poor appetite, abdominal pain, underweight, nausea and vomiting, indigestion, pruritus ani and cutaneous lesions, vaginitis, nervousness, insomnia, sleep-walking, nightmares, enuresis, encopresis, masturbation, listlessness, dark circles around eyes, nail biting, and pallor.

The symptoms most frequently noted in infected children were nervousness (including restlessness, irritability, short span of attention and emotional instability), enuresis, underweight and poor appetite, and masturbation. These symptoms were not significantly more frequent than in the controls, on statistical analysis.

Gastro-intestinal symptoms were minimal and peri-anal irritation or lesions were not noted, although in some other investigations quoted by the authors these have been shown as frequent.

"Anthelmintic treatment had no specific effect in altering the symptom picture."

L. E. Napier

VUCETICH, M. & GIACOBBE, O. Parasitologia de apendices extirpados en la ciudad de Jujuy (R.A.) [**Parasitology of Appendices removed in the City of Jujuy.**] *An. Inst. Med. Regional.* Tucuman, Argentina. 1949, Aug., v. 2, No. 3, 245–57, 2 figs. [28 refs.]

The English summary appended to the paper is as follows:—

"The authors have carried out parasitological research on 200 appendices operated in the city of Jujuy. Parasites were obtained directly after the organ being opened, and also through histological sections. 40·5% of the appendices were found to be infected, 30·5% corresponding to *Enterobius vermicularis*. The possibility of the existence of an endogenous cycle in *Enterobius vermicularis* is confirmed with new data.

"Attention is called towards the absence of anatomical lesions in the diseases. There is exposed the concept of appendix infection by *Oxyuris* without anatomical lesions."

DEFICIENCY DISEASES

NICOL, B. M. **Nutrition of Nigerian Peasant Farmers, with special reference to the Effects of Vitamin A and Riboflavin Deficiency.** *Brit. J. Nutrition.* 1949, v. 3, No. 1, 25–43, 2 figs. [59 refs.]

During 1947–48 a clinical and dietary survey was carried out in Niger Province upon three groups of racially similar peasant farmers, living under similar climatic conditions, and eating mainly the same staple foodstuffs.

The dietary survey was quantitative. The food of the adult members of three families in each area, in all 46 persons, was weighed and measured for 4 periods of 7 days each, the periods being distributed throughout the year. The staple foodstuffs in all areas were Guinea-corn and bulrush millet, cassava and sweet potatoes were used to a less extent, cow-peas and green leaves were used in small quantities. The intake of animal protein was very low, most of it being obtained from dried river fish. The outstanding dietary difference between the areas was that in one area (Bida) red palm oil was plentiful, but was almost unobtainable in the other two areas (Kontagora and Zuru), where it was partially replaced by shea-nut oil and a little butter.

Evaluation of the diets by the use of tables showed that in all three areas calcium and riboflavin were deficient, the intake of the latter being a third more in Zuru than in Bida and Kontagora. The intake of fat and vitamin A was high in Bida and low in the other two villages.

Clinical examination of sample groups of individuals was carried out in the three areas. No considerable variation in general status was found. However, the incidence of a number of stigmata associated with nutritional deficiency, varied considerably in the different villages, and comparison of this incidence with the respective dietary intakes has led to the following conclusions :—

"(1) Vitamin A deficiency results in dry and staring hair and hypochromotrichia, generalized xerosis and follicular hyperkeratosis, 'elephant skin,' 'crackled' skin and night-blindness.

"(2) Deficiency of riboflavin results in angular stomatitis, permanent gooseflesh; nasolabial seborrhoea, and increased vascularity of the conjunctiva.

"(3) Folliculosis of the skin and proliferative lesions of the bulbar conjunctiva are not due to deficiency of vitamin A, but are more likely to follow a prolonged low intake of riboflavin, if, indeed, they are in any way attributable to malnutrition."

Clinically demonstrable liver disease (7 to 15 per cent.) with urobilinogenuria (36 to 47 per cent.) was relatively common and was considered to be an important contributary factor in determining the occurrence of deficiency disease. Mean haemoglobin levels in the three areas ranged from 70 to 76 per cent. (Sahli. 100 per cent.=14 gm. per 100 ml.).

[This interesting survey adds to our knowledge of the relative importance of deficiency of vitamin A and riboflavin in the production of lesions of the eyes, the hair, and the skin. There are some points, however, which suggest that the clinical differences between the regions may not have been, in fact, so great as they appear in the tables. There was an age bias in one of the samples which considerably alters the magnitude of the differences observed, particularly in relation to dry, staring hair and hypochromotrichia. These signs, the author states, were more frequent in children than in adults. In Bida, where vitamin A intake was high and the incidence of these manifestations was low, there were in the sample only 8 children out of a total of 92 persons examined ; whereas in Kontagora there were 17 children in a total of 93, and in Zuru 13 in a total of 79.]

Dean A. Smith

DANTAS, A. Pelagra e fome na infância. [**Pellagra and Hunger in Infancy.**] *Publicacões Médicas.* São Paulo. 1949, Aug., v. 20, No. 173, 11–21, 2 figs.

An account of a child, 4 years of age, breast-fed for 2 years and then fed on pap of manioc flour and arrowroot and at times fruit. He had never suffered from the ordinary diseases of infancy. Parents and 7 other relatives all well, two had died, one of "complicated measles," the cause of the other death was not known. The history in the present case dated from about a year back when the parents noticed swelling of the legs and face and there was diarrhoea with occasionally blood-tinged motions; there had been general emaciation; during the last 5 months reddish blotches had appeared on the hands and feet tending to coalesce. A photograph shows the symmetrical distribution of the erythema on the thighs, buttocks, hands and arms. A diagnosis of pellagra and avitaminosis was made and treatment consisted of nicotinic acid, 50 mgm. three times a day, and vitamin B by mouth, with liver extract and ascorbic acid. There was considerable improvement in so short a time as 3 days, but the diarrhoea persisted in spite of all treatment and death took place from "hunger," *i.e.*, inanition, on the 6th day after treatment had started.

The remainder of the paper is taken up with a general account of pellagra, its history and symptomatology. *H. Harold Scott*

HAEMATOLOGY

KING, E. J., GILCHRIST, M., WOOTTON, I. D. P., DONALDSON, R., SISSON, R. B., MACFARLANE, R. G., JOPE, H. M., O'BRIEN, J. R. P., PETERSON, J. M. & STRANGEWAYS, D. H. **Determination of Haemoglobin. V. Precision of Colorimetric Methods.** *Lancet.* 1948, Oct. 9, 563–6. [14 refs.]

In this investigation the reliability of a number of elaborate and more accurate instruments for the measurement of blood haemoglobin are compared with one another and with the "grey-wedge photometer": (KING, *Biochem J.*, 1947, v. 41, *Proc. Biochem. Soc.* xxxii). The instruments used were the Duboscq colorimeter (used as a photometer), the Autenrieth wedge colorimeter, the Autenrieth colorimeter, used as a photometer, the N.P.L. colour comparator, the N.P.L. spectrophotometer and the King photo-electric colorimeter. The derivatives of haemoglobin that were tested included oxyhaemoglobin, carboxy-haemoglobin, cyanmethaemoglobin, acid haematin, alkaline haematin and cyanhaematin.

The results obtained with these instruments were compared with "base line" analyses of blood haemoglobin in eleven healthy males and ten healthy females; the base line analyses used were iron analysis by the titanous-chloride method (this was considered the most accurate and in the tables figures obtained by this method are used as the ultimate figures on which coefficients of variation are calculated) and Van Slyke gas analyses with oxygen, carbon monoxide and carbon monoxide after reduction.

The coefficients of variation of the results of each of these methods from the results obtained by iron analysis are tabulated. Certain conclusions are reached :—

"The first is that, despite its simplicity, the neutral grey-wedge photometer gives results that are generally as good as those of the more elaborate and expensive instruments. Secondly, in these experiments the single-cell photo-electric colorimeter has proved more reliable than the more complicated two-celled absorptiometer. Thirdly, as regards the suitability of the various

haemoglobin derivatives for visual colorimetric or photometric estimation, it appears that oxyhaemoglobin and cyanhaematin give the least variable results on the whole. Acid and alkaline haematin are inferior, though alkaline haematin gives good results when used in photo-electric instruments. In view of the disadvantage of cyanhaematin for general routine use, because of the cyanide used, oxyhaemoglobin appears to us to be the derivative of choice for the neutral grey-wedge photometer. It not only gives good results but also is the simplest pigment to prepare. . . .

"It seems, then, that the grey-wedge photometer is capable of accurate results when enough readings are obtained by several observers. To be satisfactory in use, it is essential that the scatter between the results of different observers, each taking only a few readings, should be small. This point was covered by Macfarlane *et al.* (1948), who showed that this scatter was, at least when using oxyhaemoglobin, smaller than that of any of the haemoglobinometers tested. It is therefore considered that the grey-wedge photometer should provide a convenient clinical haemoglobinometer of considerable accuracy." [See also this *Bulletin*, 1949, v. 46, 661, 662, 663.]

L. E. Napier

ASTALDI, G. & TOLENTINO, P. **Studies *in vitro* on the Maturation of Erythroblasts in Normal and Pathological Conditions.** *J. Clin. Path.* 1949, Aug., v. 2, No. 3, 217–22, 8 figs. [20 refs.]

The authors have devised a technique for studying the maturation of the red cells in normal adults and children and in various diseases. They aspirate 1 to 2 ml. of heparinized bone marrow from the sternum in adults and from a long bone in children ; they add equal amounts of both heparinized plasma from the same person and Tyrode (or Ringer) solution. This mixture is kept in an incubator at 37°C. and, at intervals of 6 to 12 hours for 96 hours, counts are made. Brilliant cresyl blue is used for staining the reticulocytes. Erythroblast counts are made on films stained by May-Grünwald-Giemsa stain. The reticulocytes were divided for convenience into three groups : Group O= orthochromatic erythroblasts : group A=reticulocytes of types 1 and 2, and group B=reticulocytes of types 3 and 4 of Heilmeyer. Normal maturation curves and the curves in Cooley's anaemia, haemolytic disease of the newborn, leishmaniasis and pernicious anaemia are given. Notes on the effect of various agents, *e.g.* temperature, and on the addition of liver extract, spleen extract, nicotinic acid and colchicine to the mixture are also given.

In the normal adult curves the orthochromatic erythroblasts rise sharply to reach their peak at 18 hours and then decline rapidly at first and later more slowly to near the base-line at 66 hours.

In Cooley's anaemia the further maturation of this cell is usually delayed or virtually absent—one graph shows almost a straight line. This delay in the extrusion of the nucleus the authors call "nuclear deficiency". In haemolytic disease of the newborn, on the other hand, from an initially low figure the orthochromatic erythroblasts disappear rapidly falling to a very low figure by the thirtieth hour.

In leishmaniasis, there is normal maturation of the earlier erythroblasts but there is usually delay in extrusion of the nucleus : in two cases at the end of 90 hours the erythroblasts had declined only to about half their peak number, whereas in two others the curves were not far removed from normal and in one of these the curve had reached the base-line by the seventy-eighth hour. This probably indicates a check in maturation of the red cells in this disease, which is possibly due to exhaustion of the bone marrow. *L. E. Napier*

PINEY, A. & HAMILTON-PATERSON. **Sternal Puncture. A Method of Clinical and Cytological Investigation.**

" This book is reviewed on p. 173.

KOENIGSFELD, E. G. H. **Nutritional Macrocytic Anaemia and Histamin-Fast Achlorhydria (11 cases).** *J. Indian Med. Ass.* 1949, May, v. 18, No. 8, 276–8.

Among a group of 5,000 employees on a railway in the Deccan (India), eighteen patients with macrocytic anaemia came under observation : of these seven showed reduced hydrochloric acid in the stomach and the remaining eleven showed histamine-fast achlorhydria.

The red cell counts were from 1,100,000 to 4,000,000 per cmm. ; two patients with 4,000,000 had already had irregular treatment when admitted. [No further haematological details are given and sternal punctures were not done.]

Eight of the eleven patients were strict vegetarians and all gave a dietary history suggesting deficiency in proteins and vitamins. Their main symptoms were those usually associated with dietary deficiency, namely, glossitis and stomatitis, diarrhoea and dermatological changes, *e.g.* symmetrical hyperpigmentation, especially at pressure points, thickening and scaly desquamination of the epidermis, and cheilosis. There was some conjunctivitis in all cases and keratitis in two. The nervous symptoms were paraesthesias, burning of the soles, cramps and absence of deep reflexes. Sub-acute combined degeneration of the cord was observed in one case. Seven of the eleven patients gave a history of ascariasis.

Crude liver extract was given in all cases, together with iron in certain cases : the latter was given in the form of ferri carbonas saccharatus made into pills with Marmite and yeast powder. The patients were given a special diet since most of them were strict vegetarians. This consisted of sweet oil, *attah*, buttermilk and *jaggery*. They were all given hydrochloric acid. In ten of the eleven cases there was a good response. *L. E. Napier*

KUHNS, W. J. **Effects of the Intramuscular Administration of BAL (2,3-Dimercaptopropanol) in a Subject with the Sickle Cell Trait : Case Report.** *Blood.* Baltimore. 1949, Nov., v. 4, No. 11, 1240–44, 2 figs.

" The effects of the intramuscular administration of BAL in a Negro harboring the sickle cell trait have been presented. It was observed that the rate of sickling was accelerated and the erythrocyte sedimentation rate was retarded in the presence of BAL both in vitro and apparently in vivo. However, the administration of BAL produced none of the pathologic sequelae characteristic of sickle cell disease."

VENOMS AND ANTIVENENES

CHOTKOWSKI, L. A. **The Treatment of Snake-Bite Poisoning. A Report of Two Cases involving the Copperhead.** *New England J. of Med.* 1949, Oct. 20, v. 241, No. 16, 600–603, 1 fig.

According to the author there are only two poisonous snakes in New England, the rattlesnake and the Copperhead (*Ancistrodon*). Two cases of bites by the latter are recorded here, one in a man of 49 bitten on a finger, the other in a lad of 19 bitten on the ankle. The symptoms were immediate pain, followed by extending oedema and tenderness and a sanguineous serous discharge from

the wounds. The blood showed an early leucocytosis and there was a little elevation of temperature. Treatment comprises first aid application of a tourniquet, not too tight, local incisions, suction, the use of antivenin—this is put up in ampoules containing 15 cc.—and of tetanus antitoxin, as tetanus not infrequently follows or is associated with snake-bites, and "general supportive measures." There was not much systemic disturbance in either of the cases here recorded, but oedema had not quite disappeared in the first patient as long as 5 weeks after, although he was able to be up and about on the 4th day. The second patient left hospital 60 hours after being admitted. Penicillin was given prophylactically in case of possible secondary bacterial infection.

H. Harold Scott

BERNAL FLANDES, F. Los falsos antidotos para las Mordeduras de las serpientes venenosas. [**False Antidotes for Bites by Poisonous Snakes.**] *Medicina.* Mexico. 1949, Aug. 10 & 25, v. 29, Nos. 585 & 586, Suppl. 117–24; 127–8.

Apart from scientifically prepared antivenins, many a nostrum has been credited from time to time with properties antidotal to the poison of snake-bites. In Mexico, at any rate, the reputation which these nostrums have acquired rests on the fortunate fact that most of the snakes inflicting the bite were not poisonous. Thus, during 6 years, says the author, on an average [presumably the annual average] 14 persons have come or been brought to the laboratory with a history of being bitten by poisonous snakes. They presented symptoms of anxiety, respiratory distress, difficulty in swallowing, loss of power in the legs, formication, rapid pulse, frequent micturition and diarrhoea, but only two had been bitten by a poisonous snake, rattlesnake (*cascabel*). He records that on one occasion 25 head of cattle were reported as having died from the bites of a snake called *bejuquillo* (rattan), but were later found to have been the victims of an epizootic; on another occasion, a horse, two calves and a man were thought to have been bitten by a venomous snake, but it was shown that in the case of the man, death was due to cerebral haemorrhage after a heavy meal [the causes of death of the animals are not stated]. Other similar instances are given.

The author then mentions several "false antidotes", among them Dr. Rosas' Antiviperine Elixir, and Stein's Viperol, and "Algalia". The two former are prepared from Guaco, a plant known also as Birdwort, and the latter prepared from Culebra seeds. Several others are referred to, but experimental work on animals bitten by, or inoculated with the venom of, poisonous snakes, showed that all were quite ineffectual as antidotes. *H. Harold Scott*

GAUL, A. T. **Habits and Control of the Black Widow Spider.** *J. Econom. Entom.* 1949, Aug., v. 42, No. 4, 700–701.

By systematic collecting in rubbish dumps and barren areas in the city of New York over a period of eight years, beginning in 1941, the author has obtained 137 specimens of the Black Widow Spider (*Latrodectus mactans*).

The web is always near the ground beneath paper or timber of large size, not beneath small twigs and sticks. In one city dump 35 nests were observed in a quarter of an acre. Collections were made between April and January but most were taken between September and November. There appears to be an autumn migration of these spiders and a redistribution of individuals from time to time. The cleaning and planting of littered and barren areas is an effective control measure. *H. S. Leeson*

DERMATOLOGY AND FUNGUS DISEASES

BOCOBO, F. C. **Mycologic Technique in Medical Practice.** *J. Philippine Med. Ass.* 1949, Aug., v. 25, No. 8, 395–9.

The author gives a very brief account of examination for the diagnosis of superficial fungus infections. Although the instructions are addressed to practitioners, some knowledge of the fungi on the part of the reader is presumed. The deep mycoses are dealt with in a table of differential characters, clinical and mycological. *J. T. Duncan*

GAMBINI, G. Su un caso di Blastomicosi neoplastiforme da "Blastomyces dermatitidis" Gilchrist e Stockes 1898 emen Moore (1933). [**A Case of Neoplastiform Blastomycosis due to** *Blastomyces dermatitidis.*] *Arch. Ital. Sci. Med. Colon. e Parassit.* 1948, Apr., v. 29, Nos. 3/4, 41–51, 3 figs.

MANWAR NG, J. H. **Unusual Forms of Blastomyces Dermatitidis in Human Tissues.** *Arch. Pathology.* 1949, Nov., v. 48, No. 5, 421–5, 9 figs.

"Forms of Blastomyces dermatitidis smaller than those previously recorded are described as observed in tissues.

"The possibility that blastomycosis and histoplasmosis may be confused because of these small forms is emphasized."

SMITH, D. T. **Immunologic Types of Blastomycosis: a Report on 40 Cases.** *Ann. Intern. Med.* 1949, Sept., v. 31, No. 3, 463–9. [12 refs.]

In North American blastomycosis the complement-fixation reaction is used for both diagnosis and prognosis: a rising titre of complement-fixing antibody, which usually indicates extension of the disease, being an unfavourable sign. The test of dermal sensitivity to blastomycin has similar uses but the reaction is usually a favourable prognostic sign. By combining the results of the two tests the author has found a better basis for prognosis and he illustrates its value in four groups of ten cases each, representing the four possible combinations of the results of the two tests.

Group I: Blastomycin test (B.T.) positive, complement-fixation reaction (C.F.R.) negative, gave the most favourable prognosis with a recovery rate of 90 per cent. under treatment. With the exception of the only fatal case, all of the patients were in good clinical condition and the disease was of the dermal and early pulmonary type and not so extensive as to provoke a marked antibody response. Cases of this kind respond well to intensive treatment with potassium iodide, but it is necessary first to desensitize the patient by injecting small doses of *Blastomyces* vaccine, for, in the hypersensitive state, iodide therapy may provoke unfavourable reactions.

Group II: B.T. positive, C.F.R. positive. The prognosis in this group, while less favourable than in group I, is still good and the recovery rate was 70 per cent. The treatment used was the same as for group I.

Group III: B.T. negative, C.F.R. positive. The prognosis in this group is bad. The absence of specific dermal sensitivity recalls the terminal anergy in fatal tuberculosis, and the frequently high titre of complement-fixing antibody was an indication of extensive disease. The recovery rate was only 20 per cent. and of the two patients who recovered, one had extensive but purely dermal lesions and in the other only the ribs and vertebrae were affected. Both cases responded well to intensive iodide therapy.

Group IV: B.T. negative, C.F.R. negative. This group included several early cases in which dermal sensitivity had not yet developed, but the combined negative may also occur in the terminal stages of fatal disease, although a high antibody titre is more usual. The recovery rate was 80 per cent. and the only two fatalities were cases which had been treated with iodide alone. Other patients were given a preliminary course of *Blastomyces* vaccine until a demonstrable, low titre, antibody response had been obtained. Then iodide treatment was instituted successfully. In one of the fatal cases excision of much of the diseased tissue was followed by iodide therapy which, by forcing resolution of the granulation tissue in a patient deficient in antibodies, led to widespread, fatal dissemination of the disease.

Three cases merit special reference. In one, belonging to group II, the complement-fixing antibody disappeared from the blood with clinical recovery, but dermal sensitivity to blastomycin, which had been depressed by desensitization, was restored and ten years later was still recorded as ++++. A case in group IV, after preliminary vaccine treatment, showed a dramatic clinical improvement with the appearance of antibodies in the blood and the beginning of iodide therapy. Another case in group IV, with much destruction of bones, appeared to have an excess of *Blastomyces* antigen in the tissues, as indicated by the local response to an injection of 0·1 ml. of hyperimmune serum, and no response to a similar injection of normal serum. Successive, small doses of the specific serum were given, which, by neutralizing the excess of antigen, allowed the development of a moderate degree of dermal sensitivity to blastomycin and a low titre of serum antibody, with ultimate spontaneous recovery.

In considering the value of intensive iodide treatment, the probable therapeutic value of the specific vaccine injections should not be overlooked.

J. T. Duncan

HEAT STROKE AND ALLIED CONDITIONS

LADELL, W. S. S. **Heat Cramps.** *Lancet.* 1949, Nov. 5, 836–9. [17 refs.]

It is usually accepted that in heat cramps there is always a fall in the chloride content of the blood and plasma. In tests made by the Medical Research Council's Heat Research Team during the latter part of the recent war some subjects had cramp fairly frequently, and the author was peculiarly susceptible to it. He was physically fit and in every way normal. Electroencephalography before and after exposure to heat and after superhydration showed no unusual cortical activity. This subject was exercised many times in the heat so that cramps might be produced and studied more closely. In 31 tests accurate salt and water balances were kept.

When cramps were provoked, muscle action currents showed definite changes which, though not peculiar to this condition, were enough to confirm the subjective complaint of cramp. Cramp usually followed voluntary contraction of the muscle, but it could be brought on by faradaic stimulation. Shortening of the muscle was necessary for cramp to occur.

The study leads to the conclusion that two main factors are involved in the causation of heat cramp. These are (i) intracellular over-hydration, and (ii) chloride loss, either absolute or relative. Generalized over-hydration does not necessarily produce cramp. The part played by cortical hormones in protecting one from cramp is discussed. It is suggested that these hormones may slow down the transfer of fluid from extracellular to intracellular spaces when

there is salt deficiency. Cramp has not been observed when the blood and plasma chloride contents have not been reduced, or when salt losses have been made good.

Unless there are both intracellular overhydration and a diminution in the chloride content of the tissue fluid cramp does not occur. The two are generally associated, in that overhydration is caused by chloride lack, but when they are dissociated no cramp occurs. *Thomas Bedford*

CULLUMBINE, H. **Oral, Rectal and Axillary Temperatures of Adult Ceylonese.** *Ceylon J. Med. Sci.* (Sect. D.) 1949, June, v. 6, Pt. 2, 88–90.

MISCELLANEOUS DISEASES

BHATT, P. K. **Tropical Eosinophilia (a Manifestation of Malaria ?).** *J. Indian Med. Ass.* 1949, Sept., v. 18, No. 12, 463–7.

A review of 19 cases.

WALLERTSHAUSER, M. 20 Fälle von eosinophilem Lungeninfiltrat in einer Kavallerie-Rekrutenschule. [**Twenty Cases of Pulmonary Infiltration with Eosinophilia in a Cavalry-Recruit School.**] *Schweiz. med. Woch.* 1949, Oct. 22, v. 79, No. 42, 1002–4. [12 refs.]

This brief communication serves to open up the question, What is Loeffler's syndrome ? It is coming to signify any condition of transient pulmonary infiltration accompanied by a blood eosinophilia, whether due to helminthic infestation—*Ascaris, Ancylostoma, Necator, Strongyloides, Fasciola, Clonorchis, Echinococcus*, etc., or to protozoa or fungi, *E. histolytica, Coccidioides*, or to pollen or virus.

The present account refers to 20 recruits at a cavalry school who, when warned for duty, complained of tiredness, feeling " out of sorts ", and an irritating cough with expectoration ; the temperature was usually normal. The lungs showed large irregular shadows with ill-defined edges in 15, foci about the hila in three, multiple small foci in one, and sharply defined foci at the border of a lobe in one. These infiltrations disappeared in three to eight days. The eosinophilia ranged between 26 per cent. of 8,200 leucocytes and 4·5 per cent. of 7,000 per cmm.

Ascaris ova were looked for in the stools of the patients, but only one was positive ; after treatment with Chenosan [not defined] seven more, and later another, making altogether nine infested. Cutaneous tests with *Ascaris* extract were made on three patients when the infiltration was at its height ; two were positive ; 17 more were tested after the infiltration had cleared up, 10 were positive, five doubtful and two negative. These results led to investigation of the possible sources of infestation and it was found that vegetables supplied were grown under conditions of faecal fertilization, the washing of them was not very thorough, the kitchens and the cooking were not of the most sanitary and the men themselves did not pay much regard to personal cleanliness and hygiene, but " ate with unwashen hands " after attending the horses or seeing to the preparation of the vegetables. *H. Harold Scott*

PROTOZOOLOGY : GENERAL

VAN THIEL, P. H. **The Transmission of Toxoplasmosis and the Rôle of** *Calliphora erythrocephala* **Meig.** *Documenta Neerlandica et Indonesica de Morbis Tropicis.* Amsterdam. 1949, Sept., v. 1, No. 3, 264–9. [14 refs.]

Five series of experiments were carried out to determine whether the non-blood sucking bluebottle fly, *Calliphora erythrocephala*, could be infected with *Toxoplasma* and, if so, whether the fly could transmit the infection. Female flies 8–12 days old were used, and all were allowed to feed in various ways upon mouse or guineapig brains infected with *Toxoplasma*. [The source of the *Toxoplasma* is not stated.] In the first series of experiments, the intestinal tract of the flies was dissected, suspended in Tyrode solution plus streptomycin and inoculated subcutaneously into clean mice. Streptomycin had been proved innocuous to *Toxoplasma* in preliminary experiments. The flies were dissected at different intervals after their infective feed ; at four hours, one day and four days, positive results were obtained. In the second series, flies were kept up to 12 days after their infective feed but no multiplication apparently occurred, for the presence of the infection was only demonstrated the day after the feed, and not at all subsequently. The third series and fifth, gave negative results. In the fourth series, the flies were fixed so that contamination of the abdomen could not take place and they were then fed on infective brain laid on a small flat spoon. Two hours after feeding, the thoracic stigma was perforated by a fine glass capillary and a little Tyrode solution was injected into the haemocoele. This process accelerated regurgitation of food—the vomit was collected and inoculated into mice, which became infected. Faeces collected from these and other flies gave negative results on inoculation.

The author, having proved that flies can regurgitate material infected with *Toxoplasma*, then proceeded to show that mice could become infected by eating food containing the organism Five out of 21 mice developed the disease in this manner. From these results, he concludes that man could become infected by eating food contaminated by the vomit of flies infected with *Toxoplasma*, although he thinks that this method of transmission is not the primary one and that the part played by blood-sucking arthropods should now be examined.

P. C. C. Garnham

EICHENWALD, H. **Experimental Toxoplasmosis. I. Transmission of the Infection in Utero and through the Milk of Lactating Female Mice.** *Amer. J. Dis. Children.* 1948, Sept., v. 76, No. 3, 307–15. [Refs. in footnotes.]

In human toxoplasmosis the only known method of transmission appears to be congenital, from a cryptically infected mother to the foetus. Congenital transmission has also been demonstrated experimentally in mice, and it has been shown that these animals can be infected by ingesting food containing the toxoplasms. Since transmission may take place *via* the alimentary canal, the author investigated the possibility of transmission of toxoplasmosis in mice through the milk, from infected lactating mothers to the offspring.

For this purpose he used a human strain of *Toxoplasma*, maintained by intraperitoneal passages through mice. After successful mating, female mice were infected with toxoplasm-containing mouse liver. After giving birth to their litters, the experimental mice were divided into four groups : (A) infected mothers nursing their own young, (B) infected mothers nursing the young of healthy mothers, (C) healthy mothers nursing the young of infected mothers, and (D) healthy mothers nursing their own young. The results of these experiments were determined by examining the young mice for the presence of

parasites microscopically and by inoculation of their organ emulsions into healthy mice. All the mothers fed on infected liver were found to be parasitized.

The results of the experiments were as follows. In the litters of group A, which were exposed both to intra-uterine and milk-borne infection, 52 per cent. became infected. In group B, exposed only to milk-borne infection, 24 per cent. became infected. In group C, in which only congenital infection was possible, 36 per cent. acquired an infection. In group D, which served as control, none of the young became infected.

The existence of milk-borne transmission, demonstrated for Group B, was confirmed by other experiments, in which milk collected from infected lactating female mice was fed through a medicine dropper to 20 suckling mice born of healthy mothers. All these mice became infected, while controls fed with the milk from healthy females were unaffected.

In mice infected congenitally there was a heavy infection, every organ being invaded by toxoplasms, whereas in milk-infected animals only the digestive tract, liver, spleen and lungs were infected, and the number of parasites was much smaller.

Further experiments have shown that toxoplasmosis in mice is probably transmitted only while the infection in the mother is in an active state, since chronic carriers proved to be unable to transmit the disease to their offspring, except when reinfected with heavy doses of toxoplasms during pregnancy. The parasites found in the milk were morphologically indistinguishable from those occurring in other tissue fluids

While admitting that the observations made on mice do not necessarily apply to human toxoplasmosis, the author suggests that the following points should be taken into consideration by clinicians : (1) the possibility of milk-borne transmission from mothers, (2) difference in symptoms between infections acquired congenitally and through the oral route, (3) possible infection by ingestion of milk from infected cows or goats. *C. A. Hoare*

SCHOEPS, J. Toxoplasmogena defektsjukdomars klinik och röntgendiagnos. [**Contribution to the Roentgen Diagnosis of Morbid Conditions attending Toxoplasmosis.**] *Nordisk Med.* 1949, Oct. 7, v. 42, No. 40, 1606–12, 4 figs. [36 refs.] English summary.

Histories are given of four cases of congenital toxoplasmosis, occurring in three adults and one adolescent. Various nervous symptoms were present, such as mental retardation, paralysis, ataxia, blindness and epilepsy, most of which were of many years' duration. X-ray examination of the skull showed the presence of multiple bilateral calcifications, characteristic of toxoplasmosis. Encephalography was carried out in two cases, and showed dilatation of the lateral ventricles and calcification of the choroid plexus. Toxoplasma antibodies were absent from the serum in all cases. The author draws attention to the value of X-ray examination of the skull in these and similar cases in which the diagnosis would otherwise remain obscure. *D. J. Bauer*

TOMLINSON, T. H., Jr., FOGG, Virginia H. & SMITH, C. S. **Parasites found in certain Sciuridae of the Southwestern United States.** *J. National Malaria Soc.* 1949, Sept., v. 8, No. 3, 202–5.

" 1. Blood films were examined from 312 members of the family Sciuridae from Southwestern Texas and Southeastern Oklahoma. Three genera and five species were represented.

"2. Twenty per cent of these rodents showed one or more parasites which included (a) a piroplasm identified as a new species, *Babesia wrighti*, in 2·6 per cent of the animals examined; (b) a trypanosome in 9·9 per cent; (c) a microfilaria in 10·3 per cent; (d) an unidentified protozoan in one animal.

"3. Double infections were observed in nine of the rodents examined.

"4. A blood film from an animal infected with *Babesia wrighti* may show only ring forms which closely resemble those of a plasmodium."

JAMES, Dinah M. **The Relationship between the Effect of certain Therapeutic Agents on Infusoria and on Pathogenic Protozoa.** *Ann. Trop. Med. & Parasit.* 1949, Oct., v. 43, No. 2, 164–73, 5 figs. [30 refs.]

The author has investigated the toxicity for infusoria of a number of drugs showing activity against various pathogenic protozoa. A correlation was sought between these properties so that infusoria might be used as an aid in selecting anti-protozoal drugs. It was first established that *Paramoecium caudatum* and *Colpidium colpoda* reacted to drugs in a roughly similar way and results were then recorded for the former organism. The compounds used were grouped under arsenicals, antimonials, antimalarials, amoebicides and diamidines. The minimal lethal concentration of each was determined by the method of serial dilution (of GUNN & SIMONART, *Quart. J. Pharm.*, 1930, v. 3, 218). Surprisingly it was found that some pentavalent antimonials were more active against infusoria than their tervalent analogues. The activities of the substances against protozoa were culled from the literature. [Some of the results quoted have, however, no scientific value as in the case of amoebicides because of the conditions under which the tests were carried out. No regard has been paid to the different action of drugs on species of parasites of the same genus.] A limited correlation in the factors noted above, which also included *in vivo* tests, was established. The abstracter would, however, agree with the author that it is doubtful whether the method will prove of any value in routine screening of antiprotozoal drugs. *J. D. Fulton*

ENTOMOLOGY AND INSECTICIDES: GENERAL

PAL, Rajindar. **Insect Cuticle and its Physiology.** [Thesis for Ph.D. (Zoology), University of London.] 79 typed pp., 18 figs. 1948.

SUNDARARAMAN, S. **Biometrical Studies on Intergradation in the Genitalia of certain Populations of *Culex pipiens* and *Culex quinquefasciatus* in the United States.** *Amer. J. Hyg.* 1949, Nov., v. 50, No. 3, 307–14, 3 figs. [11 refs.]

VARGAS, L. Bionomia del genero *Aedes*. Notas sobre los *Aedes* mexicanos. [**Bionomics of the Genus *Aëdes* with Notes on Mexican *Aëdes*.**] Reprinted from *Mexicana de Historia Nat. Rev. de la Soc.* 1948, June, v. 9, Nos. 1/2, 91–119. [Bibliography.]

A general review.

DOETSCHMAN, W. H. & FURMAN, D. P. **A Tropical Chigger, *Eutrombicula batatas* (Linn.) attacking Man in California.** *Amer. J. Trop. Med.* 1949, July, v. 29, No. 4, 605–8.

In 1947, the authors identified three larvae of a tropical mite, *Eutrombicula batatas* which had been collected in 1945 in Tulare County, California. This is the first authentic record of "chiggers" attacking man in California and also the first record of this species in the Western United States.

The presence of this mite in California was confirmed by an intensive survey made in 1948 and it was assumed that it is not at all uncommon in the Lower Joaquin Valley. The seasonal incidence is at present unknown but most complaints and specimens were received in the warm months of July, August, September and October. Chickens appear to be the favoured host but specimens from other localities have been reported from twenty host species including dog, horse, cow and turkey ; the wide range of hosts complicates control. This mite is an exceedingly annoying pest and has therefore public health significance ; so far, it is not known to transmit any human disease though the possibility must be considered and cannot be ruled out.

H. S. Leeson

WYGODZINSKY, P. Notas sobre *Reduviidae* argentinos (Hemiptera). [**Notes on Reduviidae in Argentina.**] *An. Inst. Med. Regional.* Tucuman, Argentina. 1949, Aug., v. 2, No. 3, 335–40, 2 figs.

"The author gives notes on the distribution and systematics of various species of the family *Reduviidae.* The systematic position of *Zebus illotus* Berg is fixed and a key for the determination of the species of *Aradomorpha* Champion is given, besides other notes on entomophagous *Reduviidae. Triatoma mazzae* Jörg is considered a synonym of *Triatoma infestans* (Klug), other synonyms in the Triatominae are confirmed."

HUGHES, J. H. **Aircraft and Public Health Service. Foreign Quarantine Entomology.** *Pub. Health Rep.* Wash. 1949, July, Suppl. No. 210, iv+38, 1 fig. [26 refs.] [Summary appears also in *Bulletin of Hygiene.*]

The number of aircraft arriving in U.S. entry ports (including insular possessions) has been gradually rising with the increase in air transport. The yearly total was approximately 5,000 in 1930 rising to over 45,000 in 1947. Only about half these arrivals required entomological inspection ; the other planes came from areas of little entomological importance to public health.

An aircraft disinfestation procedure was developed in the 1930s and has been evolved to meet the modern quarantine requirements of the Public Health Service. The present regulations require the emission of an aerosol containing not less than 1 per cent. pyrethrins and 3 per cent. DDT, at the rate of at least 5 gm. per 1,000 cu. ft.

The insecticide is usually dispersed from an aerosol "bomb", the following being a typical formula :—

	Per cent. by weight
Pyrethrum extract (20 per cent. pyrethrins) ...	5
DDT	3
Cyclohexanone	5
Lubricating oil	2
"Freon 12"	85

Disinfestation may be done just before take-off or while the aircraft is in flight ; but it must be accomplished at least half an hour before arrival. The ventilation system must be closed while the insecticide is released and for three minutes afterwards. On arrival at the American port, the plane is inspected by ground quarantine staff, who may require a repetition of the disinfestation before the passengers leave, if the first treatment is not considered to have been adequately done.

The Public Health Service also maintains a staff for inspection of areas adjacent to landing grounds to intercept pests which may have been introduced by aeroplane. The vigilance of these staffs has discovered several new species,

but there was insufficient evidence to prove that they had been introduced by aircraft.

The paper ends with 18 pages of appendix in which data concerning the discovery of arthropods in aircraft arriving in America are set out in 16 tables. These data are taken from records during the period 1938–47 made at Brownsville, Fort Worth, Honolulu, Miami, New Orleans, San Juan and Terminal Island. During this 10-year period, 80,716 aircraft were inspected for insects. Of these aircraft, 36 per cent. harboured arthropods and 5 per cent. contained mosquitoes. Various arthropods averaged 131 (and mosquitoes 16) per 100 aircraft inspected. Most of the insects found belonged to the order Diptera. (In 1945, 79 per cent. of the arthropods were Diptera and more than half of the Diptera were *Musca domestica.*)

Of the mosquitoes, three genera, *Culex*, *Aëdes* and *Psorophora*, comprised by far the largest numbers throughout the 10-year period. The genus *Culex* accounted for 70 per cent. of all mosquitoes, *C. quinquefasciatus* [*fatigans*] being the most common species (90 per cent. of the genus ; 63 per cent. of all mosquitoes). The anophelines only amounted to 2·4 per cent. of the mosquitoes discovered.

The records of 1945 give the following proportions of different arthropods other than Diptera : Coleoptera 5 per cent., Hymenoptera 4·7 per cent., Lepidoptera 4·6 per cent., Orthoptera 2·2 per cent., Homoptera 2·1 per cent., others 2·8 per cent.

The majority of the arthropods arrived in a dead or moribund condition ; the percentage alive averaged only 16 for the entire period. Of all live arthropods, found from 1938 to 1947, the percentage of mosquitoes was highest in 1941 with 70 and lowest in 1943 with 2·7, averaging 4·9. Nearly all the mosquitoes found on aircraft outside their range of distribution were dead, probably owing to the disinfestation measures carried out. *J. R. Busvine*

HIGGINS, A. E. H. & GREEN, A. A. **A Combined Hand- or Power-operated Sprayer for Fly and Mosquito Control.** *Ann. Applied Biol.* 1949, Sept., v. 36, No. 3, 383–93, 2 figs.

" A new sprayer is described which was designed in 1945 for the control of adult flies and mosquitoes with insecticides having a kerosene base. This sprayer has been shown in laboratory tests against houseflies, *Musca domestica* L., and yellow fever mosquitoes, *Aedes aegypti* L., to be highly efficient for both kill and knock-down and to achieve a particularly rapid knock-down of mosquitoes.

" The sprayer can be operated with a hand pump or connected to a supply of compressed air. Air consumption is very low and when the sprayer is power-operated, optimum biological efficiency is obtained at 20 lb./sq. in. air pressure. There is no spitting or dribbling from the nozzle and the mist does not settle so rapidly as to cause any appreciable staining of the floor. Although robust it is light, easily manipulated and can be dismantled into component parts for cleaning. It has no adjustments ; but the nozzle, which must be machined with precision, is automatically set in its most effective spraying position when screwed home tightly."

REES, B. E., RALEY, T. G. & DAVIS, E. D. **Pre-Hatching Treatment of Irrigated Lands with DDT, Dichlorodiphenyl Dichloroethane, and Gamma-Benzene Hexachloride for Control of Flood-Water Mosquitoes.** *J. Econom. Entom.* 1949, Aug., v. 42, No. 4, 586–90, 1 fig.

In certain districts in California the fields (pastures, orchards, vineyards etc.) are irrigated irregularly at approximate intervals of 6–12 days throughout

the summer. The nature of the soil retains pools of water and this allows prolific breeding of *Aëdes* mosquitoes.

Anti-mosquito treatments on waterlogged ground are not feasible so that attention is focussed on treatments before flooding. The experiments recorded were made with a pressure sprayer mounted on a jeep and capable of treating a 30-foot strip of land at eight miles per hour. The insecticides were used as emulsions or wettable powder and applied at the following rates: DDT at 1·20 lb. per acre; DDD (dichlor diphenyl dichlorethane) at 1·18 lb. per acre; *gamma* BHC at 0·03 lb. per acre. The unduly low rate of *gamma* BHC was used because of possible, unknown, dangers of this insecticide to grazing cattle. The insecticide DDD was used for comparison with DDT because it is much less toxic to mammals.

Results were assessed by dips in the pools formed by irrigation four days after treatment. Control pools were not appreciably changed, nor were those treated with the low rate of *gamma* BHC. DDT gave a complete kill at this time and DDD gave a high kill. It was found that control was maintained, on the average, for six weeks (or three floodings) after one treatment.

The same apparatus and insecticides were used to treat dense vegetation (which served as a resting place for *Aëdes*) with DDD. The numbers of adult mosquitoes observed on the day after spraying were very low.

J. R. Busvine

COLORADO IRIS, R. & LEYVA, R. D. Determinación cuantitative del DDT residual. [**Quantitative Determination of Residual DDT.**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1949, June, v. 10, No. 2, 101–11, 1 graph.

The English summary appended to the paper is as follows:—

"The authors determined the amounts of residual DDT in samples obtained at different periods after the spraying.

"It was found that after 28 months of the spraying, DDT was present, but in variable amounts. Out of eight samples of adobe, five contained over 400 mgr. per square meter. The average was 552 mgr. with maximum of 1,127 mgr.

"The composition of the sprayed surfaces influenced the results, those white-washed showed a lesser content of DDT, possibly indicating a destruction due to alkalies."

GOLDENSON, J., NORTON, H. E., NOVAK, C. F. & SASS, S. **Decomposition of DDT from Thermal Aerosol Dispersers.** *Indust. & Engineering Chem.* Wash. 1949, Oct., v. 41, No. 10, 2173–6, 2 figs. [16 refs.]

The tests were made on a standard aerosol-disperser *cum* smoke-generator designed by H. E. Norton and others for the U.S. Forces (*Armed Forces Chem. J.*, 1948, v. 3, 56). This generator uses an oil solution of DDT (about 6·5 per cent.) at about 36 gallons per hour and water about 12 gallons per hour. The two liquids are mixed and subjected to a temperature of 600°C.

In the tests described, the generator was operated at different temperatures from 350°C. to 700°C. and the total aerosol produced was collected, condensed and analysed. In two tests air was excluded; in another, air at 4 cu. ft. per minute was injected into the aerosol at the generator nozzle.

The chemical estimations showed that decomposition of DDT was much less than would be expected. At the standard running temperature (600°C.) only 3 to 8 per cent. was decomposed; and only 17 per cent. decomposed at 700°C.

At the lower temperaturs, the DDT molecules lost one molecule of chlorine by decomposition ; but two or three were split off at the higher temperatures.

Biological assessment of the condensed aerosol (by injection into cockroaches) confirmed the chemical estimations. *J. R. Busvine*

LABORATORY PROCEDURES

BRUCE, H. M. & PARKES, A. S. **Feeding and Breeding of Laboratory Animals. IX. A Complete Cubed Diet for Mice and Rats.** *J. Hygiene.* 1949, June, v. 47, No. 2, 202–8, 5 figs. [12 refs.]

SHORT, D. J. & PARKES, A. S. **Feeding and Breeding of Laboratory Animals. X. A Compound Diet for Monkeys.** *J. Hygiene.* 1949, June, v. 47, No. 2, 209–12, 4 figs.

JONES, J. I. M. & WOOD, E. C. **The Housing of Laboratory Animals.** *J. Hygiene.* 1949, June, v. 47, No. 2, 190–96, 1 text fig. & 4 figs. on 2 pls.

GRIDGEMAN, N. T. **Record Keeping for Laboratory Animals.** *J. Hygiene.* 1949, June, v. 47, No. 2, 197–201, 6 figs.

LAMY, L. & BONNEL, D. Emploi du sang dans les techniques de coloration des protozoaires de culture. [**Use of Blood in Staining Preparations of Protozoa grown in Culture.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 7/8, 350–52.

It is difficult to obtain good stained preparations of protozoa grown in cultures, chiefly owing to the inability to make the smear adhere to the slide during fixation. The following method was found to give good results with cultures of *Entamoeba invadens*, *Trichomonas hominis*, etc. A small drop of culture is placed at the end of a slide. If the culture contains flagellates, the drop is then exposed for 15 seconds to osmic acid. Beside this drop is then placed a drop of blood obtained from the tail of a mouse. The two drops are mixed rapidly with the corner of a cover-slip and a film is then spread in the usual way. The film is allowed to dry, or is fixed while still wet in one of the usual fixatives. *P. C. C. Garnham*

REPORTS, SURVEYS AND MISCELLANEOUS PAPERS

ROCKEFELLER FOUNDATION. INTERNATIONAL HEALTH DIVISION. **Annual Report 1948.** pp. ix+222, 15 figs. on 10 pls. New York : 49 West 49th Street.

This Report follows on the lines of its predecessors and describes the many wide activities of the Division during the year 1948. Much of the scientific work referred to has already been noted under various headings in this *Bulletin*. This includes investigations at various centres on the development of malaria parasites, their metabolism, chemotherapy, histopathological studies, entomology and control. Reference is made to the anopheline eradication campaign in Sardinia and to malaria research and control in Corsica, China, Mexico, Trinidad and a number of South American States.

Yellow fever, its virus and vectors, were studied in West and East Africa and in South America and important researches undertaken on epidemiology and control.

The work on influenza virus in New York continued and other viruses studied included mengo virus from East Africa, rabies, mumps, viral pneumonia, infectious mononucleosis, dengue and epidemic diarrhoea of the newborn. Special studies of encephalitis in California were made at the laboratories of the California State Department of Public Health. It is stated that there is increasing evidence that mumps virus plays a rather significant rôle in the causation of central nervous system disturbances and this has been demonstrated in a number of cases in which there was no clinical evidence of parotitis or orchitis.

Studies on typhus in its different forms were made at various centres and reference is made to a survey of Hillsborough County in Florida, where rodents and ectoparasites were studied, and epidemiological studies were made. The now well-known investigations into Q fever in California are described.

Other studies included tuberculosis, diphtheria, mental hygiene and rodent ecology: the last-named was undertaken at the Johns Hopkins School of Hygiene and Public Health, mainly with the object of analysing the problem of factors limiting rat populations.

Investigations on nutrition and venereal diseases were made in a number of centres and in different countries.

There is an imposing list of State health departments and local health services in America and Europe to which the Division rendered assistance during the year: the nature of the assistance given in each case is described and testifies again to the wide range of services which the Division provides in the international field. Similarly, assistance to schools of public health and of nursing is set out and covers a wide area, including America, Europe and the Far East. The Report ends with a list of fellowships and travel and training grants and detailed tables of expenditure.

The Division's Report is packed with information and is a striking testimony to the vast undertakings of the organization. *H. J. O'D. Burke-Gaffney*

COOK ISLANDS. **Annual Report for Year ended 31st March, 1949.** 50 pp.

The Cook Island group comprises 15 small islands, with a total land area of 100 square miles; Rarotonga, the seat of administration, is almost the biggest. The climate is tropical. The total population is 14,650, and the people are Polynesians, closely resembling the New Zealand Maoris.

At Rarotonga there is a hospital of 36 beds, but a new one is to be built; there is a sanatorium of 16 beds (to be increased to 36) which is modern. Other islands have small hospitals and dispensaries. There are two European medical officers, seven Cook Island medical practitioners, 14 mosquito inspectors, two European matrons, three European sisters and two Maori nurses.

Tuberculosis is prevalent, the incidence rate from this cause was 111 per 1,000, and 32 per cent. of all deaths on Rarotonga in the year 1948–49 were due to tuberculosis. Filariasis is even more prevalent (incidence 206 per 1,000); it is transmitted by *Aëdes pseudoscutellaris*, but efforts to control this mosquito are showing promise. *Ascaris* infestation is common. Leprosy is endemic in some islands, and yaws is endemic in the whole group, though active cases are now rare.

Water on the coral atolls is obtained from rain, collected into tanks, but on the volcanic islands there are the usual gathering grounds.

In the northern group of islands the diet is based largely on fish, sea foods and coco-nut products; in the southern group it is based largely on carbohydrate. There is evidence of malnutrition in the poorer people of the southern group.

Charles Wilcocks

TANGANYIKA TERRITORY. **Post-War Development—Medical Department** [SNEATH, P. A. T., Director of Medical Services]. 38 pp., 6 graphs & 3 folding maps & 1 folding plan in pocket. 1949. Dar es Salaam : Govt. Printer. [4*s*.]

This monograph has three parts. The first deals, in 22 sections, with the general problems of medical services required in Tanganyika Territory : three appendices set out the proposed development of the medical department, the medical area organization and the rural medical scheme, respectively. The second part discusses medical staff, hospital beds and requirements for medical services generally and these are illustrated by five graphs. The last part gives the detailed optimum objectives and estimated costings, and contains six appendices with numerous detailed tables. In the pocket of the back cover there are three coloured maps and a transparent overlay representing the African population, the provinces and districts of the Territory and medical facilities. The overlay indicates, by means of circles, the total number of hospital beds available and required. The Report contains a very large amount of detailed information, which should be read in the original.

H. J. O'D. Burke-Gaffney

TREDRE, R. F. **The Health of the East-African Worker with particular reference to the Sisal Industry.** Ross Institute Industrial Advisory Committee [WIGGLESWORTH, A., Chairman]. London School of Hygiene and Tropical Medicine, Information and Advisory Service. 32 pp., 5 figs. & 5 charts. [Not dated.]

The sisal industry of East Africa carries its own health problems, which are partly those of any group of men working in the open, and partly peculiar to the work itself. The sisal estates are often not big enough to permit the employment of a medical man on each, and it is therefore necessary for the managers to have a working knowledge of the prevention of diseases likely to affect the workmen, so that they may at least attempt a rational organization of environmental conditions. The provision of clear and logical statements concerning these diseases, which may appeal to managers, is a matter which must be taken seriously by medical men, and in this small booklet Dr. Tredre has evidently taken pains to include the necessary information, and to set it out effectively.

A chart shows the incidence of the main diseases on a sisal estate in the Tanga Province of Tanganyika Territory, by months. Malaria is important, and the incidence of men applying for treatment and diagnosed as having malaria increases markedly after the rainy season. Tropical ulcer, on the other hand, shows greater prevalence in the dry than in the wet season. Hookworm infection accounts for about as much sickness (judged by the numbers applying for treatment) as malaria, and bronchitis and pneumonia are important causes of ill health.

After a general foreword Dr. Tredre discusses five main subjects : nutrition, schistosomiasis, hookworm, malaria, and tropical ulcer. He gives a list of the principal local foodstuffs, and diagrams showing their content of protein, fat, carbohydrate and vitamins. In the sections on schistosomiasis, hookworm and malaria there are diagrams of the life cycles of the parasites which will materially help the non-medical reader (the obviously excited exflagellating male gametocyte of the malaria parasite is a masterpiece). The indications for antilarval work, and the use of residual insecticides, are touched upon, but very briefly, since these subjects are dealt with in other publications of the Ross Institute. Simple treatment is described for the four diseases discussed.

Estate managers will find this booklet very useful. *Charles Wilcocks*

BIBILE, S. W., CULLUMBINE, H., WATSON, R. S. & WIKRAMANAYAKE, T. W. **The Health of University Students in the Tropics (with a Note on the Incidence of Eosinophilia in Colombo).** *Ceylon J. Med. Sci.* (Sect. D.) 1949, Sept., v. 6, Pt. 3, 151–6.

As a result of the introduction of free education from the nursery school to the University the number of undergraduate students attending the University of Ceylon has increased to such an extent that theatres and laboratories are overcrowded and some students of poor parents who have entered under the system of free education have not sufficient funds to maintain themselves adequately. Reports of ill-health among the student population were prevalent and in consequence the medical staff volunteered to carry out a medical examination of the students. The examination was made compulsory and students in their first and second year—623 in all—were examined by a team of doctors. In addition to routine clinical tests, haemoglobin determinations, red and white cell counts, differential white cell counts and urine examinations were done, the fasting blood sugar level was determined on second-year students and plasma proteins on first-year students. Anthropomorphic measurements were taken on all students and among other data were vital capacity and measurements of muscular development. Where indicated, stool examinations were carried out.

The most common disorder was dental caries, the incidence of which was nearly twice as great among Sinhalese as among Ceylon Tamil students, but the incidence among Dutch Burgher students was highest of all groups. It is suggested that the cause of the lower incidence among Tamils is that many have migrated from the Northern Province where the calcium content of soil and water is unusually high.

A fairly high proportion suffered from one or more tropical diseases such as malaria and ankylostomiasis. The incidence of pulmonary diseases, ear, nose and throat defects and orthopaedic defects was much lower than that reported by PEMBERTON [*Bulletin of Hygiene*, 1948, v. 23, 367] among students in Sheffield. The incidence of nervous and psychiatric diseases was negligible compared with the Sheffield figures. Malnutrition, however, appeared to be a serious problem among Ceylon students. All students showing evidence of malnutrition came from the lower social groups and without exception were in receipt of financial assistance from the University. The incidence of hypochromic anaemias was high especially among female students but the relationship between anaemia, malnutrition and ankylostomiasis was not well marked. Anaemia and ankylostomiasis occurred with equal frequency in all social groups but rarely were both found in the same subject.

The most striking feature of the routine blood examinations was the high eosinophile count. It was not significantly different between the sexes or between different races. A further investigation showed that the commonest cause of the eosinophilia appeared to be infection or infestation with metazoan parasites.

As a first step to assist the health of students a full-time medical officer has now been appointed and cheap but nourishing midday meals are to be provided.

P. A. Clearkin

BOOK REVIEWS

BURKE-GAFFNEY, H. J. O'D. [O.B.E., M.D.]. **An Outline of Clinical Pathology for African Medical Assistants.** Second and Revised Edition. pp. viii+191, 11 coloured pls. & 5 charts. 1949. Dar Es Salaam : Govt. Printer.

This book amplifies the course of lectures given to East African Hospital Assistants. Only those who have had to teach such students know the difficulty of steering between the Scylla of saying too little and so perhaps misleading, and the Charybdis of saying too much and instilling the student with over-confidence in his powers. Though the indigenous East African is quick to assimilate teaching and knowledge it would be wrong to give very full instruction in such subjects as systematic pathology, parasitology and bacteriology to those with only a limited scientific background who are destined to work under field conditions, for the little learning is likely to become the dangerous thing, if it is not well directed and, as is clear from the title, this work, is *clinical* in its aims and application, while the interesting manner of its diction should prove an incentive to deeper study on the part of those under instruction.

During the 14 years since the first edition was published there have been many advances and some changes of thought and view on matters pathological and it can have been no easy task to gather the wheat and avoid the tares, or, in other words, to select what should be imparted to the African student and what could be safely neglected, for a well-considered *suppressio veri*, or omission of unnecessary detail, is very different from a *suggestio falsi*, or the giving of information which might be misinterpreted and erroneously applied by an uncritical student. The whole work has, therefore, been subjected to thorough revision ; some passages have been expanded, others recast, and an appendix on the interpretation of certain serological tests has been added. The useful glossary has been enlarged and it is most gratifying to see that the author, more enlightened than some of our school and even university authorities, notes the importance of a little knowledge of the classics in defining the meaning of some scientific terms.

The paragraph in the Preface that " acknowledgement is due to the staff of the Government Press, Dar es Salaam, for their skill and patient co-operation in preparing the text and illustrations " must have been written before the proofs came in, for, though the printing is clear, the illustrations good and misprints few, there are certain defects which a little more " skill and co-operation " would have obviated, *e.g.*, the omission of three of the five charts, the distortion of the scheme for classification on p. 17, the transposed legend on Plate 11, but, fortunately, none of the coloured plates is missing ; these are excellently reproduced and are highly creditable to author and printer.*

The work is divided into two main parts, *General Pathological Principles* being considered after the longer portion on the various branches or subsections of *Clinical Pathology*. This—a reversal of the usual arrangement in textbooks—is certainly the right order for the African student. Instead of having to wade through what, at an early stage of his instruction, would be arid generalities, he is introduced straightway into interesting facts which will be of the utmost importance to him in his subsequent career and he will begin to discern for himself the general principles which are brought together methodically later when he is better able to appreciate them and this very fact will stimulate him to seek further knowledge of the subject. The author drives

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* We understand that an *errata* slip is to be prepared and the missing charts provided, and it is to be hoped that these will be issued in time to overtake copies of the work which have already been sent out.

home his points in the second part by referring the student to illustrative examples with which he is already familiar from his studies in the first part.

The author wisely starts with a brief description of the microscope, its use and its care, a matter of paramount importance when careless or thoughtless usage may dislocate, scratch, or otherwise damage a high-power lens—and tyros exhibit an overmastering tendency to view objects with a high magnification before localizing them with the low power lens—perhaps making it necessary to send the instrument away for repair. Then follow general remarks on *Biological Principles* and *Medical Zoology* and a series of chapters dealing *seriatim* with the various subsections of Clinical Pathology: examination of the blood for anaemia, parasitic protozoa, metazoal embryos, bacteria, agglutination and serological tests for yaws and syphilis. Excellent coloured plates depict malaria parasites, trypanosomes, spirochaetes and microfilariae. Faecal examinations follow, for detection of pathogenic bacteria, protozoa and helminthic parasites. A plate showing the differences between *Entamoeba coli* and *E. histolytica* is particularly good and one depicting semi-diagrammatically certain helminth ova is clear, but would be more serviceable if they were drawn to scale and the magnification stated. Perhaps this is less important in the present work where the text is merely an amplification of lectures and demonstrations at which the ova themselves would be shown. Under the heading of *Ascaris lumbricoides* only the fertilized ovum is mentioned; in some patients the unfertilized are common and ought, we think, to be referred to, as the differences between them and the fertilized are marked. *Necator americanus*, though included with *Ancylostoma duodenale* among hookworms, possesses plates and not hooklike teeth in its mouth. *Oxyuris* as a generic name has for some years been replaced by *Enterobius*.

The chapter on *Pus and Body Fluids* contains all that an unqualified hospital assistant needs to know and the information is well set out. Next follow chapters on affections of the respiratory tract, of the skin and mucosae, fungal, spirochaetal and bacterial.

The subject of *Immunity* is always considered as one of the most difficult to give an account of, even to medical students, and much more so to the laity. The author is to be congratulated on his clear and comprehensive exposition in chapter XIII, but is it quite correct to say that " Precipitins are antibodies which precipitate bacteria " (p. 112; the word is omitted from the Glossary)?

The advice in the chapter on *Laboratory Routine*, for the student to accustom himself to working with the simplest materials, is very sound and he will reap the advantage when, at any time, he has to undertake an investigation in the field and needs some equipment which may be at a central laboratory far away and he has to find or devise a substitute. One " Don't " ought to be mentioned among the Laboratory Rules, for the busy worker is apt to disregard it to his peril: " Never partake of food in a laboratory." The reviewer used to exhibit prominently in his laboratory, " Never lick a label in a lab." This point is referred to in the author's Rules.

The directions for collection of specimens are sound and very necessary. Specimens of pathological and, often, of medico-legal importance are not infrequently spoiled by faulty collection and despatch.

A very valuable section of the book is the appendices. There are three of these. In the first is presented a scheme for routine examination of material likely to be sent up to the laboratory. In the second is a list of the reagents and stains in common use and formulae for reducing strong solutions to weaker of desired strength. This is one of the bugbears of all students; the reviewer used to have it posted in his laboratory, but has never seen it in any book

before this. It will save students many a headache, especially the non-mathematically minded, and much waste of material in making up fresh solutions every time. Details for carrying out examination of blood and serological tests and blood-grouping are given very adequately. To perform these serological tests is one thing ; to interpret the results accurately may be quite another ; this the worker will be able to do if he studies and considers well the information in the new appendix 3. Finally, the *Definitions* section. This calls for little comment, though of great help to the student. The prefix " iso ", meaning " equal ", is given, and as an example " anisocytosis ", but under the last name we find " changes in the size of red blood corpuscles." Would it not be better to say " Inequalities in the size . . . ", thus stressing the derivation of the word ? Under " Host ", mention is made of intermediate and definitive host ; would it not be well to add " reservoir host " ?

To sum up : The student who has the good fortune to attend this course of lectures and who conscientiously carries out the examinations and tests so meticulously described will be enabled to perform with accuracy and confidence all that is required of a clinical pathological assistant anywhere in the Colonies, and not in East Africa only, and the author is to be heartily congratulated on the successful accomplishment of a praiseworthy object. *H. Harold Scott*

SHELLEY, Horace M. [F.R.F.P.S., M.R.C.P. (Lond.), D.T.M. & H. (Eng.), etc.]. **An Epitome of the Laboratory Diagnosis and Treatment of Tropical Diseases.** 2nd Edition. 147 pp., 5 figs. 1949. London : Staples Press Ltd., Mandeville Place, W.1. [10*s*. 6*d*.]

Since the first edition was published in 1936 [this *Bulletin*, 1936, v. 33, 328] Dr. Shelley's pocket-monograph of 81 small pages has grown into a full-size book of some 150 pages. This has been achieved by a substantial increase in the material in many of the sections and the addition of four new or re-cast sections to the original ten. The book has been brought up to date by the inclusion of new knowledge, especially in respect of the newer drugs ; but it is inevitable, with present printing difficulties and various delays, that the most recent advances have not been covered. Thus, no mention is made of promin or diasone in the treatment of leprosy (though sulphetrone is included) : chloroquine is not referred to in the treatment of malaria, but is given in the list of drugs at the end of the book under the name of Aralen : reference to penicillin in the treatment of tropical ulcer is omitted.

There is however a considerable volume of new and useful information included in this edition. A new section on blood diseases in the Tropics has been added, and the examination of the blood is described in a separate section and at greater length. Two new sections are respectively those on climatic diseases and snake poisons and myiasis. The compendium of drugs has been enlarged by several entries and the section dealing with nutrition and deficiency diseases contains brief but useful information on principles of dietetics, diet sheets and laboratory diagnosis and treatment of a number of nutritional diseases. There is a detailed description of the treatment of blackwater fever and of the technique of blood grouping and transfusion. The Ide test for syphilis and yaws is described. An index of five pages has been added.

There are a few typographical errors, *e.g.*, " Shuffner's " dots (p. 28), and " ascariodol " (p. 130) have survived from the first edition : on p. 82, " *Brucella sins* " [although not without significance as a statement] is not the specific name for the porcine strain of *Brucella*. A more unfortunate printing defect, which will no doubt be put right in the next edition, is to be found in the running headings : pages 45 to 54 are headed " Blood Diseases in the Tropics "

although they deal with protozoal diseases and page 57, which deals with the treatment of yaws, is headed " Examination of the Blood".

These defects are minor ones in an admirable piece of work : and there is little doubt that Dr. Shelley's book, in its new and enlarged form, will prove of even greater value to the tropical practitioner with a small laboratory than its predecessor did in the past : and that beneficiary will have the added advantage of being able to obtain a reference book packed with information for the modest sum of 10*s*. 6*d*. *H. J. O'D. Burke-Gaffney*

BOOKER, C. G. [M.D., Ch.B., D.P.H., D.T.M., etc.]. **Public Health Bacteriology and Parasitology.** pp. xiii+254, 108 figs. 1949, Johannesburg : Central News Agency, P.O. Box 1033 & London : Gordon & Gotch Ltd., 75–79 Faringdon St. [35*s*.]

The object of this book is " to deal concisely in one volume, with the public health aspects of the more important bacteria, protozoa, helminths, molluscs, arthropods and vertebrates which are either the direct causative agents of disease or which serve as vectors, hosts or reservoirs of infection in Southern Africa".

To this task Dr. Booker has brought to bear his long experience as a health officer and teacher, as head of the South African Railway health and welfare services : and he has succeeded in compressing into some 250 pages a remarkable wealth of detailed information and illustration.

In his preface, the author makes it clear that, since the book is intended primarily for the beginner, much attention has been given to classifications and these have been made very simple. In this most difficult and delicate of tasks, he has achieved considerable success : yet, it seems to the reviewer to be perhaps a pity that, to this end, he should have retained so many old specific names, such as *Bacillus tuberculosis*, *B. dysenteriae*, *B. tetani*, which are no longer in current use and which his readers will therefore no longer ordinarily find in the medical literature.

Nevertheless, essential information is given clearly and informatively, and throughout, the author has concentrated on the public health aspects of the subjects.

The book consists of 5 sections, namely Bacteriology, Protozoology, Helminthology, Entomology and Rodents.

The first section begins with 8 short but adequate chapters, dealing with the microscope, bacteria in relation to other plants and animals and their importance in nature, bacterial growth and their response in health and disease. There is then a chapter on classification and identification of bacteria, followed by systematic descriptions of the common bacteria, spirochaetes, rickettsiae, viruses and fungi. Each chapter deals briefly with methods of spread and principles of control as well as with points on identification and characters of the organisms. There are also chapters on the bacteriology of soil, water, air, food and milk.

The section on protozoology discusses the blood, animals in relation to communicable disease (with a brief classification of them) and then deals with the pathogenic protozoa and their control.

There is a full chapter on helminthology, in which all the commoner pathogenic worms and their hosts are dealt with, together with principles of control. A short, but useful, chapter deals with snails.

The entomological section occupies 60 pages, with illustrations on almost every page. It opens with a description of the development of arthropods and then gives systematic descriptions of arthropods of medical importance, their life histories, relation to disease and control methods.

Finally, there is an extremely useful chapter on rodents, their relation to disease and methods of control. Several species are described.

The book is attractively produced, well-printed in bold type with prominent headings and profusely illustrated. There are 108 illustrations, about one-fifth of which are in colour: the latter plates, mostly illustrating micro-organisms, are large, clear, simple and in beautiful colours. Special mention should also be made of the illustration facing p. 226, in which there is not only set out a classification of animal parasites and vectors of disease, but an illustration of each of them, all on a single page.

Particularly useful are the full-page classifications of the various parasites and vectors, of which there are 16: and throughout the book this commendable feature of tabulation and visual teaching is to be found.

Dr. Booker is to be congratulated on producing a practical reference book which, although intended for the beginner, will be extremely useful for reference purposes to the medical and public health worker in remote places who has few library and limited laboratory facilities. *H. J. O'D. Burke-Gaffney*

PINEY, A. [M.D., M.R.C.P., Physician, St. Mary's Hospital for Women & Children, etc.] & HAMILTON-PATERSON, J. L. [M.D., M.R.C.S., Pathologist, Redhill County Hospital, Edgware, etc.]. **Sternal Puncture. A Method of Clinical and Cytological Investigation.** With a Foreword by the Rt. Hon. Lord HORDER, M.D., F.R.C.P. 4th Edition. pp. xv+89, 14 coloured pls. & 5 figs. 1949. London: William Heinemann—Medical Books Ltd., 99, Great Russell Street, W.C.1. [15*s*.]

The great popularity that this book has already achieved is obvious from the number of editions that have appeared in the space of eight years. This popularity is not surprising as the senior author has the gift for writing medical "best sellers": no disparagement is implied in this term.

The chapter on the technique of sternal puncture rather surprisingly appears at the end, not the beginning, of the book. It is a good chapter and the description of the operation of puncturing the sternum makes it clear that the authors are in fact writing from practical experience. [This rather obvious remark is justified by the fact that in some textbooks the descriptions of the technique—which may even include the use of a hammer—create such a sense of unreality that one doubts the practical experience of the writer.] The only criticism of the excellent sternal puncture needle—which the authors attribute to Witts—is that in time the thread of the movable guard wears and the guard has been known to slip. If it slips suddenly, the needle may penetrate the posterior plate of the sternum with possible fatal consequences.

Dr. Piney is an individualist and one expects to see this fact stamped on the book; in some degree it is, but not to the extent that it is unorthodox. In haematology, nomenclature is a matter of great importance. The authors have followed a rational classification which is a modification of Israël's; they have substituted the qualifications basophilic, polychromatic and eosinophil [one wonders why not eosinophilic] respectively, for Israël's labels A, B, and C for the different types of megaloblast and normoblast. To make quite sure that there is no misunderstanding, they have given an excellent cross-reference table of the different terms used by various writers.

The authors have given very satisfactory accounts of the sternal puncture picture in a number of blood dyscrasias with which they are obviously very familiar, but they have failed to resist the temptation to include a chapter on a subject largely outside the scope of their main experience, namely on "some protozoal disease"; the "some" is actually two—leishmaniasis and malaria.

Parasitologists will challenge the authors' use of the word " blepharoblast " in *Leishmania donovani*, which is used to describe the parabasal body. They write " quite apart from the presence of Leishmania the myelogram is characteristic," but they do not state what are the particular features which they consider characterize the myelogram: the table they give of the range in kala azar shows a low count for the granulocyte series, a very low one for the red cell series—so low that it suggests an extreme hypoplastic anaemia, which is not very characteristic of kala azar—and high lymphocyte (36–44 per cent.) and monocyte (14–18 per cent.) counts.

While one can call the presentation on the whole unprejudiced, there is a slight tendency here and there " to sell " sternal puncture: for example, in reference to oriental sore it is stated that " further investigations may show it (the parasite) to occur more frequently in the bone marrow ". They may, of course, but it is so highly improbable that it is scarcely worth mentioning the fact. Again, sternal puncture is advocated for the diagnosis of malaria. It is true that during the war and since a number of papers appeared which seemed to indicate that the procedure was of value, but for several years before this many experienced tropical workers had passed through the stages of expecting some help in the diagnosis of malaria from sternal puncture, being disappointed, and abandoning the procedure entirely for this purpose.

However, despite these minor defects the reviewer considers that the popularity of this book is amply justified. A book of this kind depends to a great extent on its coloured plates, and these are excellent. *L. E. Napier*

HORMANN, Hartwig. **Serologische Reaktionen und Immunität bei Malaria.** [Serological Tests and Immunity in Malaria.] *Schriftenreihe für Seuchenbekampfung.* 1948, v. 5, 107 pp., 42 figs. [Bibliography.] Stuttgart: Hippokrates-Verlag Marquardt & Cie. [DM.7.50.]

This detailed monograph, based on an investigation carried out in Greece, Macedonia and Italy during the war-years, 1942–1945, tends to revive the interest in Henry's flocculation test and to emphasize its practical value for diagnosis, prognosis and treatment of malaria.

[The introductory chapter devoted to a review of serological methods used in the diagnosis of malaria omits to mention some recently described tests like the buffer precipitation test, protein-tyrosine reaction and the cephalin-cholesterine test.]

In the original investigation on which the monograph is based some 6,000 tests were performed on over 1,000 cases of *P. vivax* and *P. falciparum* malaria in German Army personnel, and on a small sample of the indigenous Greek population. The author finds that Henry's first modification of the flocculation test, in which iron albuminate is used as " antigen " is more specific and reliable than the later advocated " antigen " prepared from animal melanin.

A simple agglutinoscope was substituted for photometric readings without impairing the reliability of the test.

In cases of malaria the probability of positive flocculation tests with iron albuminate was found to be between 97·8 per cent. and 99·9 per cent, as compared with 66·6 per cent. and 75 per cent. for melanin antigen. Most reliable flocculation tests with iron albuminate were obtained in chronic malaria of semi-immunes. The highest number of false positives was seen in cases of infectious hepatitis. The author believes that the iron albuminate flocculation test (designated throughout the monograph as MSR-malaria serum reaction) though not specific *sensu stricto*, since it depends on the increase of serum euglobulins, is none the less a valuable method for the diagnosis of cases of latent *P. vivax* or any chronic malaria.

Interpretation of the degree of malarial immunity by means of the flocculation test was based on the amount of flocculation in individual tests and on the changing pattern of series of serum-flocculations carried out between the primary attack and the relapse. Weak positive tests with tendency to become negative during the inter-relapse period indicate a low degree of immunity. On the other hand, strong positive tests appearing soon after the primary attack and remaining positive for a long period are related to higher degrees of immunity.

The author advocates the use of this flocculation test as a guide for treatment and tends to withhold for some time the radical treatment of malaria since it interferes with the building up of immunity.

[No distinction is made between the population not exposed to an early re-infection and a population liable to constant infection with multiple strains and species. In the latter case, the procedure of withholding an immediate radical cure might be undesirable. It is doubtful if the author's partiality to flocculation tests applied to malaria will be universally shared at the present time, since the most promising results based on serological tests seem to be the recent complement fixation methods. On the other hand, the simplicity of the modified test and its satisfactory results reported by the author may renew the interest in flocculation tests and warrant giving them further trials under both laboratory and field conditions.] *L. J. Bruce-Chwatt*

HULSHOFF, A. A., KNOPPERS, A. T. & VAN PINXTEREN, J. A. C. **Middelen Tegen Malaria.** [Anti-Malarial Drugs.] 108 pp., 19 figs. & 2 charts. 1948. 'S-Gravenhage : Staatsdrukkerij- en Uitgeverijbedrijf.

This monograph constitutes a survey of the modern antimalarial drugs, their nature, pharmacology, action, use, applications and the experimental work carried out in connexion with them. It is made up of seven sections, four of which are contributed solely by Dr. A. Th. Knoppers of Amsterdam, two by him jointly with Dr. A. A. Hulshoff of Rotterdam, while the section on chemistry and pharmacology is written by Prof. J. A. C. van Pinxteren of Utrecht. The work was published in 1948 and the preface is dated October 1947, so that the most recent advances are not included : but the considerable lists of references which follow each section indicate the international scope of the authors' studies.

The first section deals with the malaria cycle, with special reference to therapeutics and the extra-erythrocytic cycle. It reviews the various facts and theories on this subject up to 1947, but does not therefore of course include the classical work of SHORTT and GARNHAM and their colleagues : it is however of biological and historical interest and the various points covered are illustrated by 9 figures. There are 39 references.

The second section occupies 24 pages and deals at some length with the chemistry and pharmacology of quinine and related alkaloids, plasmoquine, other quinoline derivatives (including chloroquine, nivaquine C and others), atebrin [mepacrine] and paludrine [proguanil]. Biochemical features, including blood concentrations, are dealt with in some cases and full chemical formulae are reproduced. There are 25 references.

The third section refers in three pages to experimental testing of antimalarials in animals and birds and gives some protocols relating to findings. There are 10 references.

The fourth chapter discusses at length (in some 40 pages) the general use and effects of the various drugs. Dosage, concentrations and results are dealt with and in each case a " schema " is given for a particular drug, showing in tabular form its prophylactic, curative and suppressive effects and its action on relapses

and on gametocytes in the case of the three principal clinical forms of malaria. There are six pages of references, conveniently divided according to the drugs discussed.

The fifth section refers shortly in two and a half pages to drug resistance in man and animals and is accompanied by 17 references : the sixth deals in four and a half pages with the working mechanism of antimalarial drugs and has 26 references : and the last comprises a short note, with 12 references, on antimalarial drugs in blackwater fever.

Throughout, as one would expect from such an authoritative source, regarding these drugs, much emphasis is placed on the cinchona group, but not at the expense of the newer preparations which are dealt with fully up to the time at which the survey was made. The monograph is written in Dutch but the clear protocols, figures and references make much of the work commendable to many readers who are not familiar with that language.

H. J. O'D. Burke-Gaffney

VALE, Sérgio. **Subsidiary Studies to Leprosy of the Eyes.** Accompanied by the statement made by Professors Joaquim MOTTA and Eduardo RABELO. 194 pp., 93 figs. (55 coloured). 1946, Rio de Janeiro : Published by Serviço Nacional de Lepra : printed by Imprensa Nacional, Brasil.

This book by Dr. Sergio Vale has been translated into English by Dr. Mitchell S. Smolens and represents the results of studies in ocular leprosy carried out over a period of several years in Brazil.

The author classifies leprosy into three clinical types : lepromatous (L), maculo-anaesthetic (MA) and tuberculoid (T). The maculo-anaesthetic type comprises the three clinical varieties, macular, tropho-anaesthetic and the maculo-anaesthetic. The seriousness of the leprous ocular manifestations depends upon the gravity of the clinical type. The lepromatous type produces the most serious ocular involvement, the maculo-anaesthetic type is far less serious, but is responsible for the myoatrophy of the orbicularis muscle. The more benign tuberculoid type is only responsible for madarosis and a slight conjunctival congestion of the lesions situated around the eyes : no other important change in the eyes occurs with this type.

The importance of the slit lamp in the examination of the eyes is stressed by the author.

The second chapter is devoted to the study of the limbus and the differential diagnosis between leprous and trachomatous vascularization of the cornea.

In the third chapter the author discusses the method of ocular transmission and regards the exogenous passage as most probable, although the endogenous one may in rare cases be a possible way of transmission. The differential diagnosis of leprosy, syphilis and tuberculosis is discussed in the fourth chapter and the superciliary region and the eyelids in the fifth chapter. In all clinical forms of leprosy, alterations in these two regions are observed—madarosis, lepromas, infiltrations, macules, anaesthesia and lagophthalmy. They are of very great importance, not only from the general diagnostic point of view, but also as regards the type and severity of the disease.

Madarosis is very common and very often is the first sign of the disease that is noticed by the patient. Lepromas occur on the border of the upper eyelids but do not occur on the lower eyelids. Lagophthalmy causes an ectropion of the lower eyelid resulting in epiphora and corneal ulceration and is not accompanied as a rule by loss of corneal or conjunctival sensibility.

The author is of opinion that there is no disease of the lachrymal sac or duct peculiar to leprosy other than dacryocystitis produced by naso-lachrymal obstruction and secondary infection.

He also considers that leprous lesions do not occur in the conjunctiva but that membrane performs a very important rôle in the fixation and transportation of the Hansen bacilli from the exterior to the adjacent episcleral tissue at the limbus.

Anaesthesia of the conjunctiva is most commonly found in the lepromatous, macular or mixed forms and is of very great importance in prognosis and differential diagnosis.

Separate chapters are devoted to the study of lesions of the cornea, iris and ciliary body. The author considers that lesions on the posterior segment should be very carefully interpreted before being diagnosed as of leprous origin, although they undoubtedly do occur.

The last chapter is devoted to lagophthalmy.

The book is well illustrated with original coloured drawings and photographs. It is probably the best and the most complete work that has been written on the eye in leprosy, the author being a competent ophthalmologist with a sound knowledge of leprology. *E. O'G. Kirwan*

DIAS, Caio Benjamin. **Quimioterapia Antimonial na Esquistossomose Mansônica.** [Antimony Compounds in Infestation by *Schistosoma mansoni*.] [Thesis.] 1949, pp. xiv+348, 42 figs. [Numerous refs.]

It would be a matter for wonder if an author were to write a thesis of 350 pages solely on the treatment of Schistosomiasis mansoni by antimony. Consequently, one is not so surprised to see that this thesis covers more than the title suggests. The whole work is divided into two main parts, each further subdivided into chapters and sections. Part I deals with matters of a more general character; part II refers to the author's own work.

An introductory chapter considers briefly the pathogeny and pathology of the disease, the distribution of the worm and the ova in the body and the lesions caused by emigration to unusual sites; an attempt at a clinical classification is made, not, in the reviewer's opinion, very satisfactorily because a classification, properly so-called, should run as it were on parallel lines and should not overlap. Thus, a classification is made into 3 main groups: 1. Covering the period of evolution and activity of the worm, and this is subdivided into active and inactive and the former into acute and chronic. 2. According to the intensity of the clinical manifestations—latent or asymptomatic, mild, and severe. 3. According to special sites mainly involved, intestinal, hepatic, splenic, pulmonary, etc. The author acknowledges that this is complicated and that forms may coexist, and so he finally decided on classifying into active and inactive, and under the former he includes those starting acutely, and the chronic active forms, which latter are subdivided into latent, mild, and severe, the special localizations being included in the last.

A useful section is one which tells of the laboratory methods of establishing the fact of cure of the infestation by search for ova, by the cuti-reaction, by serological tests for fixation of complement, precipitin reactions, and by blood examination for eosinophilia. Of historical interest is the list of drugs which have from time to time been used in the treatment of schistosomiasis from 1885 to the present day, divided into antimonials and others, and the graphic formulae of the trivalent and pentavalent compounds, followed by brief remarks on each, copiously documented by references to the literature. The toxicity of the different compounds in therapeutic doses, and fatal accidents recorded, receive attention and a long list is given of the numbers treated, cured, and relapsing, as recorded by authors since Christopherson first reported results with tartar emetic in 1918.

In the second part the author describes his personal experience in the treatment of this disease. In Belo Horizonte conditions for such a study are particularly favourable because, in the first place, material is abundant; in the second, the infestation is often unaccompanied by other disease; thirdly, patients can be grouped in similar circumstances of life and occupation; lastly, others in the district have shown their willingness to cooperate in the investigation.

In the available space, one cannot refer in detail to the many points considered by the author. They include a clinical examination of the patient, examination of the faeces, the intradermo-reaction, total and differential leucocyte counts, urinalysis, taking of electrocardiograms and X-ray examination of the thorax. In some cases there were in addition rectal biopsy, serological tests, the Machado reaction (6 of these were positive) and xenodiagnosis for concomitant Chagas's disease, myelograms, tests of hepatic function and others. Some of these were carried out on 367 patients admitted for treatment in the 12 months ending 20th December, 1948. Three hundred and twenty-two of them were, according to the classification given above, mild chronic cases, 27 severe chronic, 9 of the hepato-splenic form, 2 of the acute and 7 of the "probably inactive form."

The drug was given intravenously or intramuscularly and different schemes were tried, intensive over one to seven days. These are detailed and the toxic symptoms which a few patients exhibited are discussed, with illustrative cases. The histological changes found in the myocardium in two fatal cases are well shown in photomicrographs. A special chapter describes the electrocardiographic changes occurring in intensive treatment with antimonials and the action of BAL on these modifications. This chapter reproduces 582 electrocardiographic tracings. In nearly all the patients (96·7 per cent.) some modification of the electrocardiogram was observed and changes in the T wave in 96·6 per cent., grade I in 66·6, grade II in 23·3, and grade III in 6·6 per cent. In a final section the author sums up his conclusions on the efficacy of antimonials in this disease, especially is their action enhanced by association with vitamin K; also on the tolerance, the risks, and the lethality—two patients undergoing the ambulatory form of treatment died—which point to the advisability of admission to hospital for treatment; also the contraindications. The treatment is not advised for persons over 50 years of age, or for anyone with the acute toxaemic form, those with hyperpiesis and a systolic pressure over 180 mm. Hg, or with a systolic pressure below 100 mm. Pregnancy is also a contraindication. Vomiting, persistent diarrhoea, hyperpyrexia, cardiac arrhythmia and mental disturbance during treatment are indications for temporary stopping of the administration.

The author gives more than 250 references to the literature of this subject from writers in all parts of the world where schistosomiasis exists, evidence that he has made a very thorough study of the question, and this thesis will probably hold for many years—until, indeed, more effectual drugs are produced for treatment—the position of being the most complete work on the use of antimonials in Schistosomiasis mansoni. *H. Harold Scott*

BATES, Marston. **The Natural History of Mosquitoes.** pp. xv+379, 9 figs. & 16 pls. 1949. New York: The Macmillan Co. [$5.00.]

This book is an important contribution to the literature on mosquitoes. Its importance rests not so much in its utility as a summation of the significance of mosquitoes as vectors of disease but rather as a reference to the vast field of wider biological problems which has emerged from investigations with economic or social needs as their initial stimulus. Here is a vigorous plea for the biologist, in his special spheres of ecology, physiology, behaviourism,

cytology, genetics and so on, to recognize the mosquito as, both individually and collectively, a living organism for which a rich background of well documented and varied information exists, and which invites, indeed needs for its further comprehension, the interpretations which can only follow upon researches within these spheres.

The selection from the extensive information already available and its presentation are admirably suited to the function of the book. There is little of morphology or of taxonomy except in so far as these are a necessary background to function or to problems of speciation and distribution, particularly in regard to the more subtle biological and physiological distinctions upon which the realities of subspecies or other variants so intimately depend. Of the twenty chapters, four are devoted to the adult mosquito, two to the egg, four to the larval stage and one to the pupal stage. Characteristically, each chapter pays particular attention to the effects of various factors on the organism and takes into account the reactions and responses of different species to the conditions of their particular habitats. The correlation of laboratory experiments with field observations is carefully weighed to demonstrate not only the value of laboratory investigation under controlled conditions but the need to interpret such work with due regard to the more complex circumstances to which the organism is exposed in nature. The section dealing with larval breeding places is well illustrated by twenty-one photographs which bring out something of the conditions imposed upon the entomologist in his work, the simple apparatus required in collection, as well as the nature and variety of breeding places.

There are three chapters concerned with mosquitoes in relation to other organisms ; one deals solely with the transmission of *Plasmodia* ; another with virus infections ; and the third includes filariasis, predation and parasitism, and the association of mosquitoes and *Dermatobia*. The chapter on virus transmission summarizes the recent findings on the epidemiology of yellow fever, and on the neurotropic viruses isolated in this type of work, and gives an account of mosquitoes in relation to the transmission of dengue, encephalitis and numerous other virus diseases. This, however, is far from being merely a catalogue of fact, but is the basis of a discussion on the adaptability of virus, infective dosages, mosquito susceptibility, and other aspects of this expanding and fascinating subject. A similar breadth of treatment is accorded to the account of mosquitoes and malaria, factors governing mosquito infection and the transmission of the disease comprising about half of the chapter.

Turning next to the question of speciation in mosquitoes, the author draws for material on the *Anopheles maculipennis* group, on *A. punctulatus*, *A. stephensi*, *A. gambiae*, species groups of tropical America, and on *Culex*, and discusses these matters against a general statement on the validity of the species concept and the mechanisms of speciation in the animal kingdom as a whole. A chapter on the classification of mosquitoes contends mainly with the principles and philosophy of taxonomy and is supplemented by an appendix giving a classification list of anopheline and culicine mosquitoes down to subspecies based substantially on the work of Edwards. The author provides, in a chapter on the distribution of mosquitoes, references to taxonomic works for the different zoo-geographical regions or for particular countries within these regions.

There is a great deal of useful information in the chapter on techniques, which deals with methods of collecting material and data in the field and concludes with a description of techniques for breeding and manipulating mosquitoes in the laboratory.

A final chapter on the strategy of mosquito research reviews very briefly the major methods adopted for the control of mosquitoes, with special references

to the contributions which have been and can still be made through such work to the biology of mosquitoes.

The book comprises 379 pages, a good index, a bibliography of some 600 publications, 14 tables, 9 text figures and 16 plates. It is well bound and printed and of moderate size. Through no fault of the author's the price in sterling areas has risen from 25s. to 35s.; the book is, even so, still a sound investment. It is the author's fine accomplishment that he has presented a comprehensive and stimulating account of a very complex and vital subject—the natural history of mosquitoes. This is not a book which impresses merely as a text book for reference and formal study. The discursive scholarship of the text makes it very readable and the subject matter is handled critically and constructively. *D. S. Bertram*

ELLERMAN, J. R. **The Families and Genera of Living Rodents. With a List of Named Forms (1758-1936)** by R. W. HAYMAN & G. W. C. HOLT. Vol. 3. Pt. 1. pp. v+210. 1949. Mar. London: British Museum (Natural History), Cromwell Road, S.W.7. & H.M. Stationery Office. [£1 10s. 0*d*.]

A note on p. 192 explains that this volume, except for some of the Addenda, was completed for publication in 1946. Volume III as a whole is chiefly concerned with the publication of many new figures which could not be included in Volumes I and II, but in this Part I of Volume III there are no illustrations.

Part I contains some 24 pages of additions and corrections to Volume I, and 91 to Volume II. In Appendix I the author discusses Simpson's "Principles of Classification" (39 pages), and in Appendix II (30 pages) he gives notes on the rodents from Madagascar in the British Museum and on a collection from that island obtained by Mr. C. S. Webb. Eight pages of Addenda, comprising short notes on various points, complete Part I, except for an index (on similar lines to those of the earlier volumes) of 18 pages.

Scientists who have used the two earlier volumes as their source of detailed information on this enormous subject will need this new publication. It is obviously a record of a very large amount of original and painstaking research on the rodents themselves and on the literature relating to them. The reviewer has found Volumes I and II invaluable as a work of reference, and the components of Volume III, produced in the same attractive style, will evidently be of the same high standard. *Charles Wilcocks*

COLONIAL OFFICE. **A Note on some of the Scientific Studies undertaken by Members of the Colonial Medical Service during the Period 1930-47, with a Bibliography.** Colonial No. 252. 47 pp. 1949. London: H.M. Stationery Office. [1s.]

This publication, issued originally by the Colonial Office as Miscellaneous No. 515 for limited circulation, has now been published by H.M. Stationery Office as Colonial No. 252 and is purchasable direct from any of the branches of H.M. Stationery Office or through any bookseller. It was reviewed in this *Bulletin*, 1949, v. 46, 1090.

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